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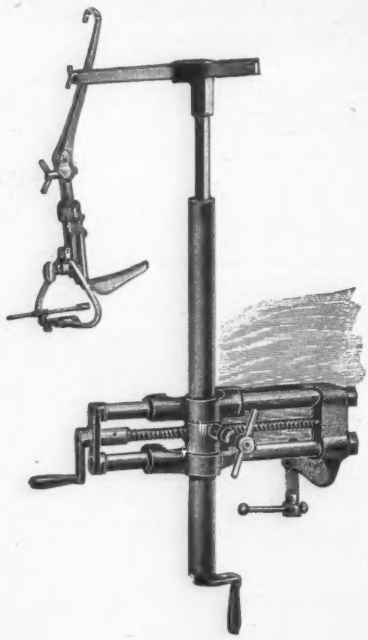

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LARYNGOSCOPE.

VOL. XXVI. ST. LOUIS, NOVEMBER, 1916. No. 11

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

SUDDEN DEATH DURING BRONCHOSCOPY: A PRELIMINARY REPORT OF A PHYSIOLOGICAL STUDY.*

DR. CHARLES JOHNSTONE IMPERATORI, New York City.

Sudden death occurring during bronchoscopy may be considered as a rare accident. There are very few, if any, of such cases that have been reported and are in the literature.

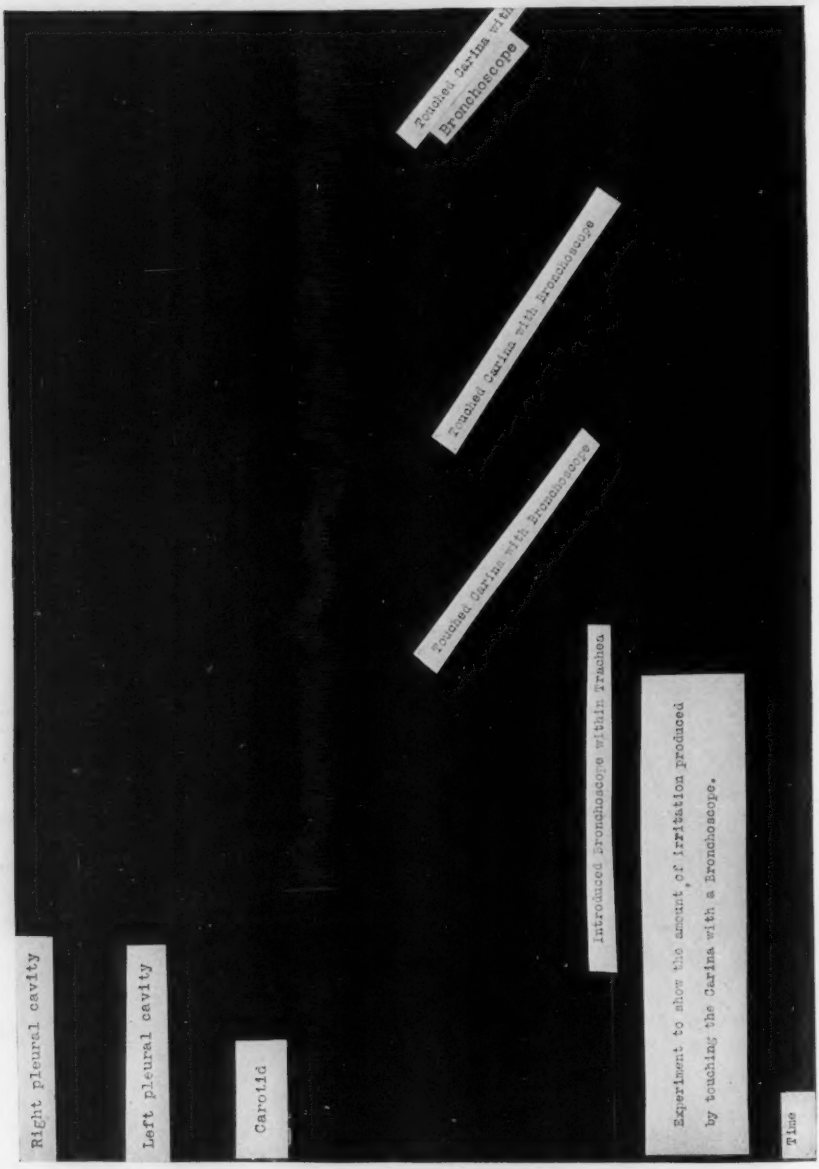
Having witnessed the death of a child during bronchoscopy by a colleague, well versed in this manipulation, and the cause of death not being ascertainable because of the parents' refusal to permit an autopsy, the writer felt that an investigation of this sudden death would be of interest.

The case stimulating this investigation was that of a child, about one year old and in whom part of a peanut was lodged within one of the smaller bronchi. It was during lower bronchoscopy; the attempt by the oral route having proven unsatisfactory a low tracheotomy was done. The child was under ether anesthesia and previous to the sudden exitus in very good condition. Breathing was regular, pulse was good and color excellent.

A number five tube of the Brunings' extension tubes was passed into the trachea and on into the right bronchus. Examination was being made for the foreign body, in the region it was sus-

*Candidate's thesis read before the Twenty-second Annual Meeting of the American Laryngological, Rhinological and Otological Society, in White Sulphur Springs, West Virginia, May 5 and 6, 1916.

From the Physiological Laboratory of New York University, Prof. Holmes C. Jackson, Director, to whom the author is indebted for the many courtesies extended to him.


Right pleural cavity
Left pleural cavity
Carotid
Introduced Bronchoscope within Trachea
Experiment to show the amount of irritation produced by touching the Carina with a Bronchoscope.
Time

Tracing No. 1.

pected to be in, when suddenly the child stopped breathing, gasped a few times and was dead within a few moments, the heart impulse simultaneously becoming very weak and then ceasing. Pulmotor application, within thirty seconds from the onset and kept up for a considerable period was of no avail. The child never made another attempt at respiration. All other methods of resuscitation proved useless.

A series of experiments conducted on dogs resulted in certain conclusions. These are not absolutely final. In order to complete these experiments, attempt to solve this physiological problem and translate the animal experimentation to the human, further investigation is necessary. This report, therefore, is but a preliminary one.

Group 1: Twelve dogs, that had been narcotized repeatedly and used for demonstrating bronchscopy and esophagoscopy, died within three to five minutes when a seven millimeter bronchscope was pushed through a bronchus and into the pleural cavity.

Group 2: Two dogs, very lightly narcotized with morphin and further anesthetized with ether, died very suddenly when the pleural cavity was punctured with a bronchoscope. These two dogs died in less than two minutes.

Group 3: Two dogs under morphin and ether anesthesia died within five minutes when the external chest wall was stabbed and an opening made into the pleural cavity.

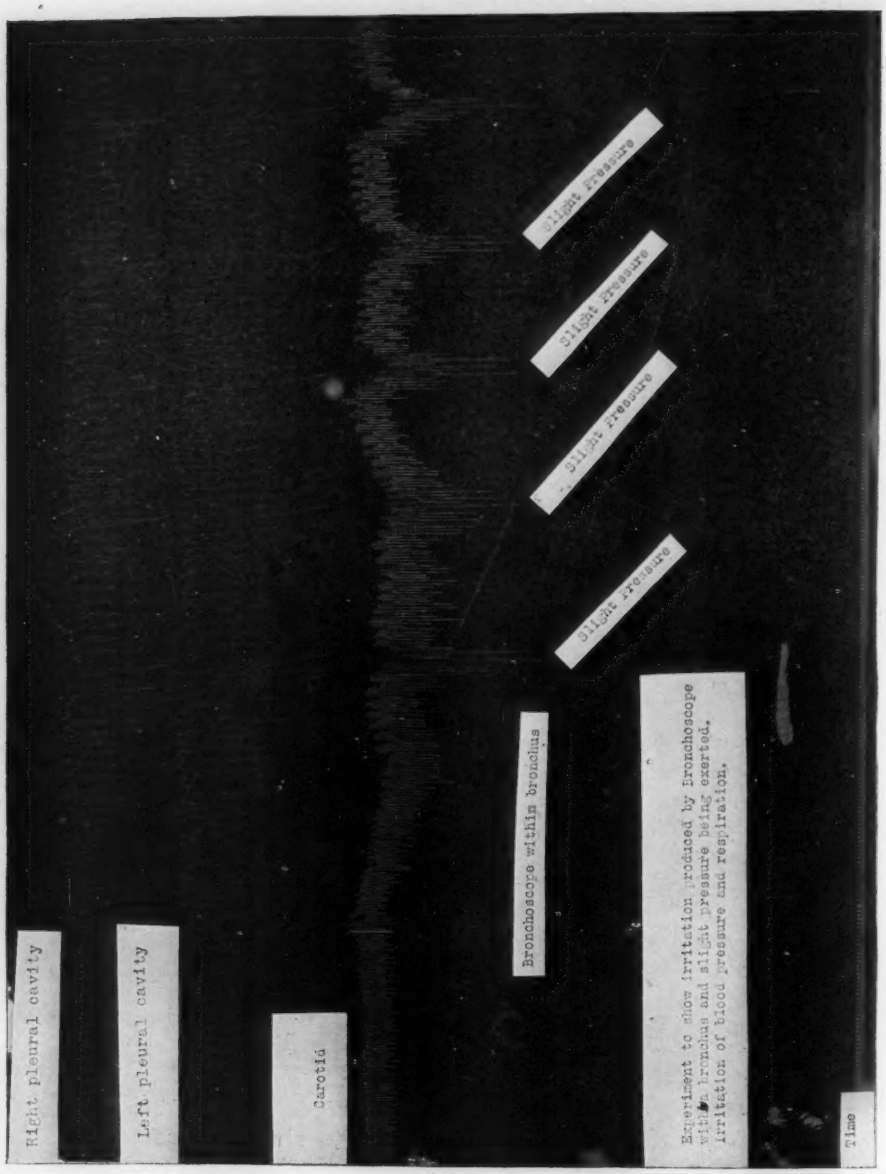
Group 4: Eight dogs under morphin and ether anesthesia died in from twenty minutes to two hours when the pleural cavity was entered with a bronchoscope and later, as soon as symptoms of asphyxia supervened, the external chest wall was punctured. By alternately closing and opening the chest wall the animal could be asphyxiated at will.

Group 5: Four dogs, under morphin and ether anesthesia and in which both vagi were severed two hours previously, died within five to eight minutes after pushing a bronchoscope through a tracheotomy wound into the pleural cavity.

Autopsy findings in all these animals showed both lungs completely collapsed. The surface of the lung injured and the point of puncture in mostly all the animals was so small that it was difficult of detection. The right heart was enormously distended and there was practically no blood in the left side.

Carotid blood pressure tracings were taken in nearly all of these experiments and they showed vagal stimulation, when the bronchoscope was in the smaller bronchi. After puncture the tracings were

Tracing No. 1.


Right pleural cavity
Left pleural cavity
Carotid
Bronchoscope within bronchus
Slight pressure
Slight pressure
Slight pressure
Slight pressure
Experiment to show irritation produced by bronchoscope with bronchus and slight pressure being exerted. Irritation of blood pressure and respiration.
Time

Tracing No. 2.

characteristic of asphyxia. Death in most of these animals was due to a rapid asphyxia.

In those animals that died within a moment or so it would seem as though some other element must be the cause of death. The mere presence of the bronchoscopic tube in the smaller bronchi and particularly if the instrument is acting as a dilator, is sufficient to produce acceleration in the number of respirations. Slight pressure exerted in these smaller bronchi produces hyperpnea. On removal of the tube from this region the animal will again breathe as before its introduction. Traction of the mucous membrane in the bronchi produces the same phenomena.

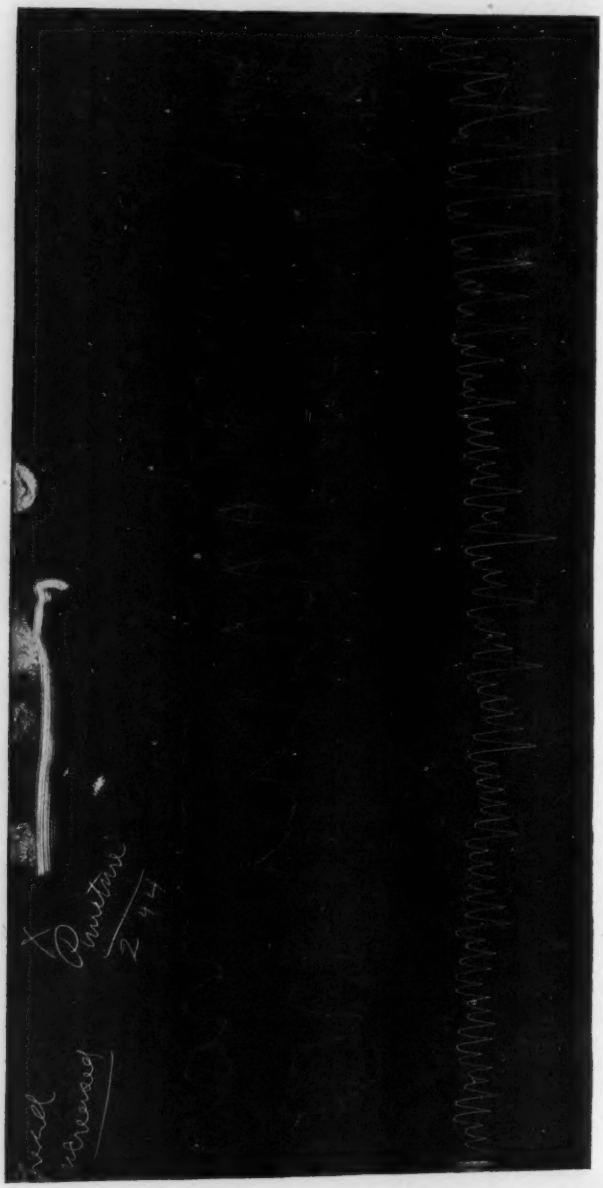
In several places in the literature a statement has appeared that a foramen or communication exists between the two pleural cavities in dogs and cats. As these were the animals used in this series of experiments and there being some doubt as regards this statement it was necessary to prove or disprove it.

Repeated dissections on formalin injected animals was done. After complete fixation of the tissues the pleural sacs were filled with colored fluid but no communication could be found. The animals that were killed by puncturing the pleural sac of one side were in turn hardened, and colored solution injected in one pleural cavity promptly appeared in the other. The communication was usually through minute holes in the pleural septum, separating the two lungs, just in front of the heart or in front of the esophagus, behind the heart. Usually, a number of holes, varying in size from one to two millimeters were found.

A series of experiments conducted to prove that the difference in atmospheric pressure in one pleural cavity over the other was the cause of the traumatic rupture of the pleural septum resulted in the following findings: A number of dogs and cats were morphinized and etherized in the usual manner. The pleural cavity of each side was connected with a manometer. In order to avoid traumatizing the median septum, the pleural cavity was approached through the diaphragm. Both sides showed a negative pressure of about five to six millimeters of mercury. Puncture of one side by bronchoscope showed immediate positive pressure on that side. The side not punctured remained negative until the first expiratory effort, when it too became positive and remained positive until the death of the animal. The interval of time varied from ten to twenty seconds.

In the study of these groups of experiments, all of the animals died in a comparatively short time. In group 2, it will be noted

Tracing No. 2.



Tracing No. 3.

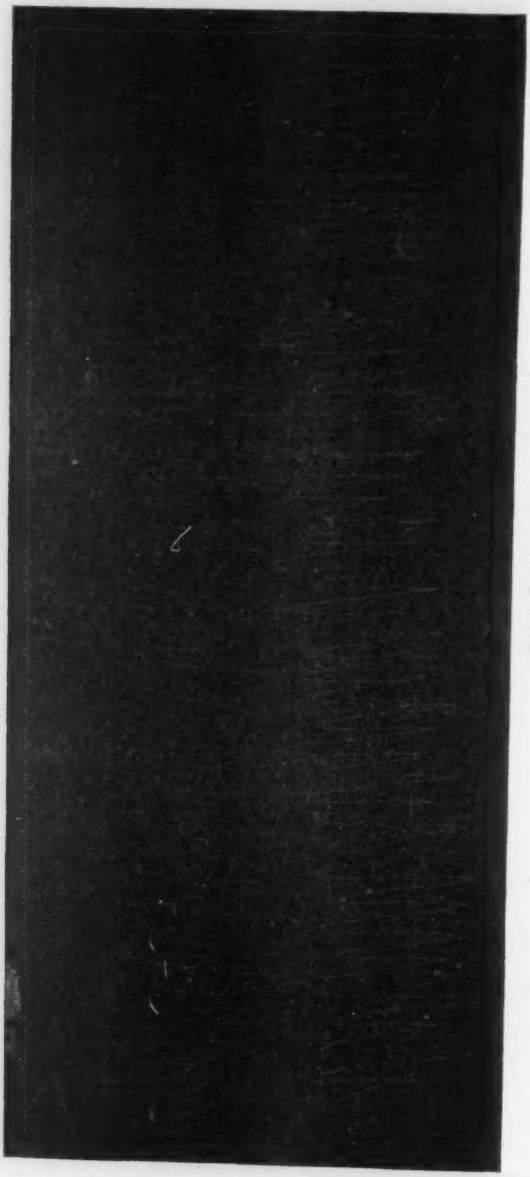
that they died much more promptly than the others. This time element must be considered and one would be likely to conclude that in this instance the immediate cause of death was probably due to a central inhibition induced by the sudden collapse of the lung.

In groups 1 and 3, 4 and 5, the animals died from asphyxiation, death resulting from collapse of the lungs due to the mechanical pressure of the atmosphere in the pleural cavities. The animals in group 5 succumbed to the same influences as those in groups 1 and 3, excepting the element of time was somewhat longer. In group 4 an attempt was made to relieve the pressure by external puncture but with negative results, in so much as life was concerned but with very interesting findings, as noted above.

In attempting to translate these animal experiments to the human, we do so knowing that acute pneumothorax is not necessarily fatal. In fact, the greater majority of these cases recover, all depending on the condition of the lung, the pleura and the character of the communication with the atmosphere. A healthy, resilient lung will completely collapse, when its pleural sac is opened, either through an external opening or by rupture of a bronchus. Moderately acute pneumothorax has existed during life practically without symptoms, postmortem revealing the condition. But these were cases that came on more insidiously and in whom the continued supply of atmospheric pressure was not constant or in those cases of pulmonary tuberculosis, with pleuritic adhesions.

There is a considerable number of cases recorded of sudden death during the therapeutic introduction of nitrogen gas within the pleural cavity. The cause of these sudden deaths has been given as gas embolism or pleural reflex. One case mentioned in Chevalier Jackson's book developed a pneumothorax after a search for a pin that was located at the periphery of the lung and the foreign body was later removed by a tracheotomy. This patient made a complete recovery. However, the pneumothorax came on slowly and as stated by Dr. Jackson was evident within twenty-four hours. Dr. Jackson notes that he has seen cases of pneumothorax and mediastinal emphysema sent to him in a dying condition, that followed endoscopic manipulation.

There is a considerable number of cases reported by recognized authorities of acute pneumothorax resulting in death, within a very short time, that is a few moments. Of course, bilateral pneumothorax would be an exceedingly rare condition. However, it is possible to conceive that a condition might obtain as in the dogs and



Tracing No. 4.

cats experimented upon in which there was a traumatic rupture of the pleural cavity not punctured.

Osler mentions two cases of acute pneumothorax, one patient dying in twenty minutes and the other in half an hour. B. F. Curtis notes one case of sudden death following acute pneumothorax. There are many other cases recorded in the text books. There is also recorded a rare form of injury of the chest in children, in which instance the chest is compressed, without fracture of the ribs, etc., but in whom there is a rupture of the lung followed by pneumothorax; this condition is rapidly fatal.

Conclusions: The pleural cavities normally are under negative pressure. Entrance of the atmospheric pressure, within the cavity produces a collapse of the lung on that side, and the concomitant symptoms of asphyxia.

In the human, one would not be warranted in saying that collapse of one lung will cause death, unless the conditions were exceptional. We are of the opinion, tentatively, that this sudden pulmonary collapse, in an otherwise healthy lung produces sufficient respiratory inhibitory impulses to inhibit respiration for a time. These impulses, in turn, through association fibers in the nucleus of the vagus are sufficiently powerful to communicate themselves to the efferent inhibitory fibers of the vagus governing the heart. Thus we get a respiratory cardiac inhibition, with the concomitant symptoms of asphyxia.

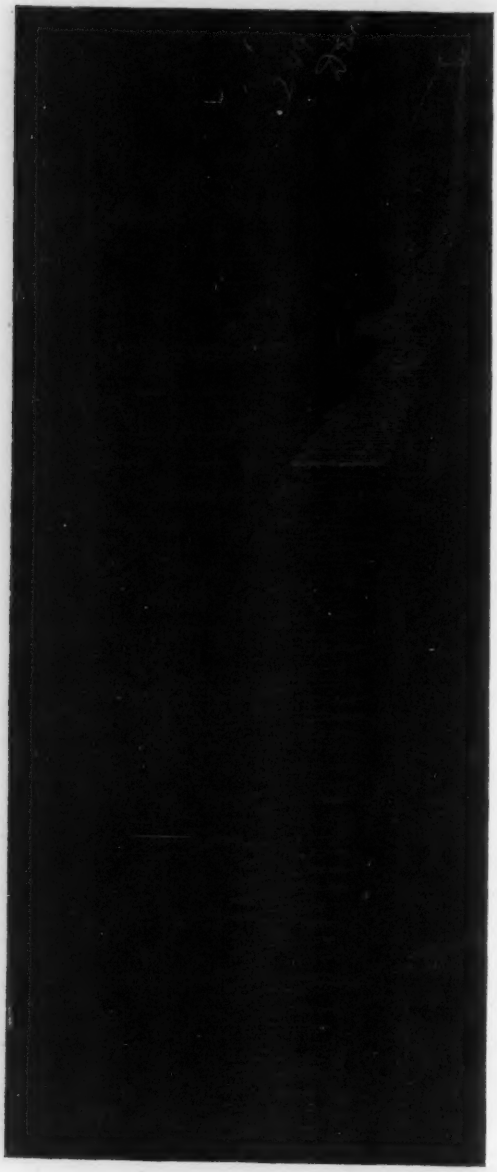
We must also take into account the painful stimuli that are produced by the puncture of the pleura and the atmospheric pressure within the pleural cavity. These stimuli may be sufficiently strong to inhibit respiration for a time.

Practical Conclusions: In arriving at these practical conclusions we do so mainly from our work on animals. Extreme gentleness should be the watchword for all practicing endoscopy.

To properly endoscope the bronchi, force is not necessary. Successful results are obtained by the proper manipulation of the tube and the amount of trauma is thus necessarily lessened.

The amount of force required to pierce the lung and viceral pleura in some instances is very slight.

In those cases in which a foreign body has been lodged within the bronchi for some time, and knowing that the lung tissue is less resistant because of the consequent inflammation, incident to the pressure of the foreign body, extra precautions should be taken and extreme gentleness be exerted, that perforation be guarded against and a possible fatal outcome be avoided.



Tracing No. 5.

Sudden increase in the number of respirations during bronchoscopy and particularly during endoscopy, of the smaller tubes, should put one immediately on guard against possible perforation.

It is hoped that the writer may be permitted at some future meeting to present for your consideration a completed observation on this very interesting subject.

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17 East 38th Street.

Leech in the Larynx. S. Hernandez, *Rev. Ibero-Amer. de Ciencias Med.*, July, 1916.

The patient had drunk from a jar and since then had complained of dyspneic paroxysms, incessant cough and hemoptysis. He felt relief after expelling large quantities of blood. Nasal chambers and nasopharynx negative. Laryngoscopic examination showed severe congestion and swelling of the epiglottis and arytenoids and a portion of leech was visible beneath. The leech was extracted by means of a forceps at the first attempt. It is estimated that the leech had been in the patient's larynx for twelve days. P. F.

THE RELATION OF AIR PRESSURE IN THE NOSE TO EAR DISEASE.*

DR. JOHN W. DURKEE, Brooklyn, N. Y.

In the literature of otology there is often found the statement that, back of a nasal obstruction, in the posterior part of the nose and naso-pharynx and in the Eustachian tube and middle ear, there is, during inspiration and during the act of swallowing, a negative pressure that is greater than that in the normal nose, and that this increased negative pressure is a common cause of ear disease, especially of chronic catarrhal otitis media. The following investigations were undertaken to determine, if possible, to what extent these statements are true.

Practically all those who have worked in this field emphasize the difficulties to be overcome. Respiration is a voluntary act to the extent that it can be made deep or shallow or interrupted at will, and its character is easily altered by outside influences. The mucous membrane of the nose is very sensitive, and the introduction of any instrument into the nose can easily change the depth or regularity of the respirations, or cause a congestion of the mucous membrane. A nose when examined may appear normal, but at some subsequent examination the turbinates may be congested and swollen and one or both sides of the nose obstructed. These are all factors that have an influence upon the respirations.

In these investigations the air pressure in the nose was measured with a water manometer. It was soon found that the oscillations of the water in the tube were so rapid that they could not be recorded with the unaided eye, so the following recording instrument was made: A U-shaped glass tube (*a*—Fig. 1) having an inside measurement of 11mm. was connected at one end by a rubber tube (*b*) with a straight No. 3 Eustachian catheter (*c*). Into the other end was fitted a thin cork (*d*), the edges of which were nicked or cut so air could enter freely, and in the center of which was inserted a small glass bead. On the water in the side of the tube that was not connected with the catheter, was placed a small cork (*e*) carrying a thin aluminum wire (*f*) that passed through the hole in the center of the bead and, extending about three inches above the bead, was bent at a right angle and filed down to form a

*Presented as a candidate's thesis to the American Laryngological, Rhinological and Otological Society, May, 1916.

needle (*g*) about an inch long. This needle was so bent that it rested lightly on a smoked paper (*h*) on the revolving drum (*i*). The drum was made to revolve at a uniform speed by clock works driven by a weight. A needle (*j*), pressing on the smoked paper as the drum revolved, made a straight horizontal line that may be called the zero line. The lines made on the smoked paper by the needles (*g*) and (*j*) were made to exactly coincide by raising or lowering the needle that made the zero line. All records above this line represented positive pressure and all below it negative pressure. At first the Marey's tambour was used, but was rejected because,

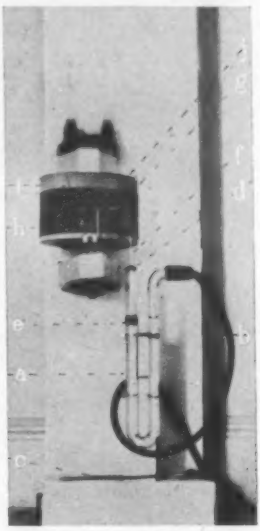

Fig. 1.

with that, the manometer was not an open tube, but a closed one, and the rubber covering the tambour might offer a resistance to the movements of the water, and this resistance might vary, depending upon the age of the rubber and the degree of tension with which it was stretched. By the method used above the float and needle moved freely, and the actual movements were recorded on the smoked paper.

An effort was first made to measure the negative and positive pressure in the normal nose during normal respiration. Ten patients who had practically normal noses, and who had been under treatment for several months, some of them for several years, and

were used to having the Eustachian catheter passed for inflation of the middle ear, were chosen, and from them records of the air pressure in the nose were made in the following manner: With both sides of the nose open, the straight catheter was inserted into one side of the nose and the point carried to the place to be measured and held there while the patient breathed quietly four or five times. The record obtained on the smoked paper will be called the "Nasal Respiratory Curve." At first it seemed that it would be possible by examining the tracings made from a nose to say whether the nose was a normal one or not, but that does not seem possible because these tracings made from normal noses differed in some respects. These differences were due not only to differences in the nasal cavity, but largely to the depth and character

Fig. 2.

of the respirations and the changes in the glottis. While there are these differences and although it is not possible to say that there is a typical normal nasal curve, yet the records were alike in many respects, and it is possible to explain the curve and its formation as follows:

The expansion of the lungs causes a negative pressure in the air cells of the lungs, the trachea, pharynx and nose, which is recorded by the dropping of the curve from the zero line (*a, b* at *c*—Fig. 2) to (*d*) the lowest point of negative pressure in the nose. When the negative pressure is produced in the nose the air enters through the nostrils to neutralize it, and, as this takes place, the curve at its lowest point turns, at times rather acutely, and again more slowly, and begins to ascend. Before the negative pressure in the nose is entirely neutralized by the entrance of the air through the nostrils, expiration begins and a positive pressure is produced in the air cells of the lungs, in the trachea and in the pharynx. At some point on the ascending portion of the curve (as at *e*) while there is still a negative pressure in the nose and before the ascending portion of the curve has reached the zero line, the air from the

lungs enters the nose, quickly neutralizes the remaining negative pressure, causes a positive pressure, and the curve is quickly carried to the highest point of positive pressure (*f*). The latter part of expiration takes place more slowly than the first, and there is usually a rather gradual dropping of the curve from the highest point (*f*) until it reaches a point (*g*) on the zero line.

In order to determine the positive and negative pressure in the normal nose during respiration thirty-two tracings, or records, were made, in the manner given above, from the ten patients with normal noses, recording the pressure at about the middle of the inferior meatus; and thirty records of the pressure in the naso-pharynx, the catheter being passed through the nose. These records were made at various times and usually from both sides of the nose, giving a total record of about a hundred inspirations and the same number of expirations. The lowest point below the zero line reached by each of these inspirations was measured, the average obtained, and that average given as the normal negative pressure in the nose. The highest point above the zero line reached by each of the expirations was measured, the average obtained and that average given as the normal, positive pressure in the nose. The figures obtained in this way were, in the middle of the inferior meatus +2.5 and —3.4 mm., in the nasopharynx +2.6 and —3.5. An examination of these figures shows that in the normal nose the air pressure in the inferior meatus and in the naso-pharynx are practically the same, and that the negative pressure in both places is greaer than the positive.

In order to compare the air pressure back of a nasal obstruction with that in the normal nose, ten cases were chosen in which there was deviation of the nasal septum. Of these ten cases, six had a deviation of the L-shaped variety, and in each of them the vertical part of the deviation came in contact with the outer wall of the nose, leaving only a small slit between the deviation and the floor of the nose. In the remaining four cases the deviation was of the horizontal variety, beginning low down in front and extending up and back, and making pressure on the turbinate. In each of these cases there was decided obstruction on one side of the nose, but free breathing on the other. In making these measurements the catheter connected with the manometer tube was passed along the floor of the nose, underneath the deviation, and the point carried behind the deviation to about the middle of the inferior meatus and held there while the patient breathed and a record was made. Eleven of these records were made. Eleven records were then made from a corresponding point on the clear side of the nose.

The following figures were obtained: From the obstructed side behind the deviation +3.4 and —4.5, from the unobstructed side +4.2 and —5.2. In some cases records were made from the naso-phadynx, but in only a few was this possible, because these patients were not used to having the nose treated and were apprehensive, and in some cases the passing of the catheter was painful. These few records are not enough to be considered. Seven of the above normal cases were then chosen and records made in the following manner: The catheter was passed along the floor of the nose until the point reached the middle of the inferior meatus, when that nostril was closed with cotton and, the other side remaining clear, a record of the pressure behind this obstruction was made. The cotton being allowed to remain in this side, the air pressure at a similar place on the clear side was then measured. In this way eleven records were obtained from the obstructed side and eleven from the clear side. The average of these measurements was: Behind the cotton on the obstructed side, +3.5 and —5.0, and on the unobstructed side, +4.3 and —6.4. The cases of deviation of the septum and those in which one side of the nose was closed with cotton were combined, giving a total of twenty-two cases in which one side of the nose was obstructed while the other side remained clear. In the cases, closed with cotton and in at least six of the cases of deviation of the septum this obstruction was practically complete. The average of these twenty-two records was: On the obstructed side, +3.4 and —4.7 mm., and on the unobstructed side, +4.2 and —5.8 mm.

Comparing these measurements with each other and with those obtained from the normal nose, it is found that both the positive and negative pressures are greater on the unobstructed than on the obstructed side, and that on both sides the negative pressure is the greater, as is the case in the normal nose. On the obstructed side the negative pressure is 1.3 mm., and the positive is .9 mm. greater than the normal, an actual increase of the negative pressure over the positive pressure .4 mm. On the unobstructed side the negative is 2.4 mm., and the positive 1.7 mm. greater than the normal, an increase of .7 mm. in favor of the negative. The character of the curves in the cases of nasal obstruction did not seem to differ from those made from the normal cases, except that the oscillations above and below the zero line were higher.

In order to measure the air pressure in the naso-pharynx when the nose is obstructed and when the patient is breathing through the mouth, both nostrils were closed with cotton after the catheter had been carried through one side of the nose into the naso-

pharynx, and a record was made while the patient breathed with the mouth open. These measurements show that under these conditions there is both a negative and a positive pressure; neither is as great as normal and both seem to be reduced in the same degree.

In measuring the air pressure in the nose during the act of swallowing it was soon found that no reliable records could be obtained from the patients, so the following plan was adopted: The catheter was passed through one side of my own nose into the naso-pharynx. At the end of expiration, with both nostrils clear, the breath was held until the recording needle came to rest at the zero line. Then swallowing, the breathing was still retarded for a short time, then continued. In this way any possibility of confusing changes in the curve caused by swallowing and those caused by breathing were obviated. Records were then made in the same way while the breath was held at the end of inspiration. Then the side in which the catheter was placed was tightly closed with cotton and records were made as before. The result of these records was the same; the needle during the act of swallowing did not leave the zero line, showing that while swallowing with both sides of the nose clear, or with one side entirely closed, there is neither a negative nor a positive pressure in the naso-pharynx, but the normal atmospheric pressure. When both sides of the nose were tightly closed there was at the end of swallowing a slight drop of the needle below the zero line, but never more than a millimeter. As this, however, is a condition rarely found, it need not enter into this consideration.

From the above investigations we reach the following conclusions: (1) It is possible, by measuring the air pressure in the nose in a large number of cases, to find the average pressure and to call this the normal, but as there are many factors that can alter the character of respiration, and in this way change the air pressure in the nose, it is not possible to call any nose abnormal in which the air pressure differs from this average. (2) The determining of the air pressure in the nose or the character of the nasal respiratory curve cannot, as was at first hoped, be of any great value in determining the presence or absence of nasal obstruction. (3) The average measurements obtained by thirty examinations representing about one hundred complete respirations, made at various times upon the patients who were perfectly familiar with the passage of the catheter, and, because of this, breathed normally during the examinations, and in whom the nose was normal, is as follows: normal air pressure in the nose at the middle of the inferior meatus, +2.5 and —3.4 mm. of water; in the naso-

pharynx, +2.6 and —3.5 mm. of water. These figures differ from those given by Mink[1], which were in the turbinate region, +4 and —6, and the naso-pharynx, +8 and —6 mm. of water, and from those given by J. L. Goodale[2], which were +4 and —6 in the naso-pharynx. Dr. Scanes Spicer[3] reports some of his work in this field and mentions curves made, but the report is so brief that it is difficult to draw any conclusions. (4) In the normal nose the negative pressure during inspiration is practically always greater than the positive during expiration. (5) In the presence of marked unilateral nasal stenosis there is found back of the obstruction a negative pressure that is greater than normal but also an increase of the position pressure, and the increase of the negative over the increase of the positive pressure is only four-tenths of a millimeter. In the side of the nose that is unobstructed the increase of both the positive and negative pressure is greater than on the obstructed side, and here the increase of the negative pressure over the increase of the positive is seven-tenths of a millimeter. It would seem that any effect the increase of the negative pressure during inspiration might have in causing a congestion and, later, a thickening of the mucous membrane of the nose, would be overcome by the positive pressure during expiration. The Eustachian tube is a rather long tube of small caliber, its walls lying in contact. If the membrana tympani is intact, the tube is closed at its outer end. It does not seem possible that the increase of negative pressure that was found is great enough to cause any rarification of the air in this closed tube or any retraction of the drum at its outer end. Mouth breathing in cases of nasal obstruction causes a lowering of both the negative and positive air pressures in the naso-pharynx rather than an increase. During the act of swallowing in cases of nasal obstruction there is in the naso-pharynx neither a negative nor a positive, but just the atmospheric pressure.

From the above investigations it can be said that, in cases in which there is nasal obstruction, the negative air pressure in the nose and naso-pharynx during inspiration, with the mouth closed or open, or during the act of swallowing, is not to be considered a cause of ear disease.

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142 Clinton Street.

CONDUCTION APHASIA IN A CASE OF BRAIN ABSCESS.*

Dr. Emil Amberg, Detroit, Mich.

November 21, 1915, Dr. E. C. Hoff called me to see Mr. J. W., 37 years old. The patient appeared to be very sick, feverish. He had been ill for about ten days, with severe pain. He had had a middle ear suppuration for sixteen years in his left ear. After an effort, while cranking his automobile, he felt bad. Thinking of some complication of the chronic middle ear disease, I showed the patient a pencil. He could not name the pencil when he saw it, but he named it after I had asked him whether it was a pencil. Keys and watch were recognized but could not be named. I diagnosed an intracranial complication of a chronic middle ear suppuration. Dr. Carl D. Camp, of Ann Arbor, saw the patient, in consultation, the same night after his removal to Grace Hospital, and examined him from the neurologic standpoint. Dr. Camp diagnosed an abscess of the brain located in the temporal lobe and advised that the patient should have an eradication of the original focus in the middle ear, with an exposure of the dura if a sinus leading to it could be found; if no sinus was found, a second operation should be done directly over the supposed site of the abscess. "Since the patient had no motor aphasia, and could evidently recognize objects seen, though he could not name them, it appeared that the lesion involved only the intracerebral tract leading from the center, for object recognition, in the occipital lobe, to the motor speech center. This tract is in the white matter of the temporal lobe and it was therefore supposed that the abscess was located there. The other neurologic findings were practically negative. A lumbar puncture showed about 500 lymphocytes to the c.mm. in the spinal fluid though there was no clinical evidence of the meningitis. This was evidently a case of the so-called "meningitis sympathica" such as described by I. Strauss (Transactions of the American Neurological Society for 1915)." (Dr. Camp.)

The next morning, November 22nd, I performed a radical mastoid operation and removed masses of cholesteatomatous material. Pus led the way upward and backward, and a small opening of the skull above and somewhat behind the external ear canal exposed a fresh pinkish-colored pachymeningitis.

*Read before the American Otological Society, Washington, D. C., May, 1916.

Patient was not benefited by the operation. November 26, Dr. Canfield, of Ann Arbor, made an extensive opening adjacent to the upper little opening for about a length of 1½ inches backward, and of a width of about ¾ to 1 inch, exposing also the lateral sinus. Introduction of the brain knife through the before-mentioned area of pachymeningitis, to a depth of 2 cm. did not reveal anything. The patient did not improve.

November 30, four days later, while doing his dressing in bed, I incised vertically the dura, which did not pulsate, about half an inch behind the before-mentioned spot of pachymeningitis, and introduced Jackson's brain searcher, following Dr. Harold Wilson's suggestion, to whom I intended to demonstrate the procedure, forward, upward and inward, and liberated about six drachms of pus. No pulsation; colon bacillus.

December 1, I introduced the brain searcher backward and liberated about three drachms of pus. No pulsation of brain. Not much improvement.

December 4, I introduced the brain searcher deeper and more forward and liberated over an ounce of pus. Brain pulsated, patient better.

December 7, more pus was liberated by me. Good pulsation. The brain searcher was directed to a point about ½ to ¾ inch above eye-brow, in the middle of the forehead, and introduced to a depth of about 1¾ to 2 inches. About one ounce of foul smelling pus, with gas was evacuated. In my estimation the cavity was about 2½ inches long toward the glabella, 1½ inches high, and about ½ inch deep. This estimate may be faulty. Upon Dr. Hoff's suggestion, a rubber drainage tube was introduced. Discharge all day. The drainage tube was introduced daily to a depth first of about 4 cm. and gradually shortened.

About the 15th of January the brain wound had closed entirely. The general clinical symptoms, pathological findings and details of technic are not the subject of my paper. I intend to dwell only on the speech disturbances.

As mentioned before, a pencil, keys and a watch could not be named when I saw the patient first. Dr. Canfield, of Ann Arbor, examined also the tactile sense. A coin was felt in the right hand as such. Other articles were not named. Dr. Canfield wrote me as follows:

First: "He had distinctly a tactico-optical aphasia. He could not name objects until immediately after they were named for

him. He held this memory picture for from 30 seconds to a minute and a half but never longer, as far as my observation went, until that day I saw him at home. That is, while in the hospital he could not name a watch but called it a letterhead, invariably. If he was told it was a watch, he could name it and held memory for from 30 seconds to a minute and a half. You will remember that my diagnosis was a subcortical brain abscess and that we stated before the operation that, due to the fact that the collection of pus was subcortical, it would probably not be evacuated at the first operation, but would be reached three or four days later because by that time the incision made in the brain at the time of my operation would have permitted the pus to pass along the path of lower resistance to the surface at which it would be possible to evacuate.

"This has been my experience with other subcortical abscesses and points toward the proper method of treatment of deep brain abscesses. The patient showed no clinical evidences of meningitis other than a leucocytosis of the spinal fluid."

December 23, when the patient saw a watch he could not name it but spelled: w-a-t-c-h. When shown a pencil he said: "I cannot see it," probably meaning that he could not see the word pencil.

January 3, 1915, when shown a collar button he said: "Collar, necktie pin." He tried hard to say the word but could not do it until it was pronounced for him. When shown keys he said, "k-y-s" and then "keys." When shown a nail file he said "man" (probably wanting to say "manicure") "that's funny," "manicure instrument, fingernail business." When I rubbed my card with the nail file he said, "would not call it sawing." He now knows and pronounces well, pieces of money, also pencil, watch.

January 4, 1916. When shown the nail file of yesterday he said: "This is a manicuring instrument." When I asked him, Is it a saw," he said, "No, it is a file."

January 5. He could remember his special nurse's name for the first time, although she had been with him for six weeks. He said that he could not remember the nurse's name before even for a short time and that he repeated it before "a hundred times," then when it "slipped for a moment it was gone."

The nurse made some additional report: "Patient had forgotten whether sugar or salt was used with meat. When he wanted sugar he would say vinegar. About two weeks after the pus was found he would look at illustrated magazines and was able to recognize the different buildings and localities but could not read

the printing underneath. About four days later he began to slowly spell words. Several days later he could read slowly. Four weeks after the pus was found he wrote his first letter. Only two words were misspelled. He said it was easier for him to write than to speak. Names seemed to be the most difficult. Before the pus was released he suffered severe pain, but he seems to have forgotten it." (Patient told me that about two or three weeks were almost blank to him, although he remembered that he commented on the nice suit of one of the consultants.)

"In the sixth week, at times, when he could not say the word, he could spell it. He went to the club; he knew the members there but could not call them by name. After he had left the club he could name them."

January 11. Patient said that he could write better than read. Said he could write fast but when he read he could not "say" the word he read,—sometimes some simple word. If he wanted e. g., to pronounce a word like "closed," he might say "c-l-o-s-e-d." "I can write that word." Before Christmas he said, he made only two mistakes in writing a letter. He said he knew that he made the mistakes but he could not figure out how the words should be spelled.

On January 17, in my office, patient wanted to tell me the size of the boats going to Puerto Rico, where he is in business, and he said that they were not so big as the boats going to Europe, about 8,000, but could not remember "tons." He knows that his memory is not right yet. He walks every day and has a good appetite.

January 18. When asked about the size of the boats to Puerto Rico, he remarked, without being assisted, "8,000 what you call it pounds?—no, what is the name of it—8,000 pounds?—no—tons."

January 22. A nurse, a patient of mine, was present in the office. She wore a velvet coat. He could not say "velvet," but he knew it was not silk or linen. A few minutes afterwards he had forgotten the name "velvet." A few minutes later he had forgotten it again; then he said he would remember it because he spelled it for himself. The fourth time, after quite a few minutes had elapsed, he remembered the word. Patient claimed that he never was familiar with velvet. He said that he remembered a telephone number for an hour that morning.

January 24. When asked for name of material of cloth of a patient, he stated correctly "velvet." He said he had written it down.

January 29. Said that about one week ago he played billiards (three balls) and played it just as good as ever. Made once 14 in succession, average 3½ in succession.

February 3. He said that when he wrote to his wife in the hospital before Christmas, when he was writing with regular speed, words came to him more easily. When he tried to read what he wrote he could not tell whether it was right or wrong. He could not connect his thoughts, that he had written correctly, with only two words wrong, that he wrote "phonograph" instead of "telephone." The second mistake he did not remember. He had to spell names to himself before he could pronounce them. He saw the name written in his mind.

Three weeks after he entered the hospital he could not pronounce the name of his old friend the family physician, Dr. R., unless he put the whole thing together—"Doc. R.," the name he used for years. He did not call his sister-in-law by her right name (Susie), but called her Margaret (this is the name of his other sister-in-law, who was not here at all, but in Albany). They are said not to look alike. He did not know that he had made a mistake. After sister-in-law Susie went to the hospital to see him, he did not mix up names any longer.

After Christmas, I may add, I asked him when I changed his dressing, to name rubber gloves. He said, "rubber—rubber—I got some for Christmas—gloves."

November 29, 1915. Dr. C. C. McClelland reports: Examination of fundi with "H. & C." drops, pupils dilated fully and equally in usual time. Left eye details of fundus easily seen. Nerve head indistinct on nasal side, more clearly defined on temporal side. Right fundus about same as left.

November 20. Total leucocytes 20,900; Poly. 88.4 per cent; blood culture, negative.

November 23. White, 14,932; Poly., 79 per cent.

November 25. Total white, 14,100; Poly., 79 per cent.

November 26. Total white, 13,240; Poly., 75 per cent.

November 27. Total white, 10,666; Poly., 71.6 per cent.

November 29. Total white, 11,000; Poly., 71.1 per cent.

December 7. Total white, 12,000; Poly., 68.5 per cent.

December 23. Cells in spinal fluid, 172 per c.mm. No organisms.

April 4, 1916, the patient wrote me from Puerto Rico that he felt very well but that he tired quickly and that he sometimes had headache and dull pain in the head when he worked too much.

Blau (Encyklopaedie des Ohrenheilkunde, 1900) says: That in otitic intracranial complications an abscess in the temporal lobe touches the sensory speech cortex by a distant effect (Fernwirkung), that it never destroys it and that probably never are all paths emanating from the cortex interrupted. The amnestic aphasia occurs most frequently in otitic brain affections. In single instances the word treasure is reduced to one or a few words (Monophasia), sometimes the faculty to read (Alexia) or to write (Agraphia) is more or less diminished if the abscess extends more posteriorly into the occipital lobe, a speech disturbance may occur which has been named "optical aphasia" by Freund and Oppenheim. It occurs by interruption of the association fibres between sound-memory and optical centers. The word-memory cannot be used any longer for speech by way of vision. If the connection with the sound-memory center is brought about in another way, e. g., through the hearing organ, tactile sense, etc., the patient immediately finds the word for the object presented.

Oppenheim (1908, page 84) says, under "optic aphasia (Freund)" that objects are seen and recognized, but cannot be named, although the patient can speak and can find the word if the stimulus is awakened from another sphere of the senses. Example: He cannot name a watch, but he knows that it is a watch. Another calls a handkerchief which is shown to him a sponge, a rag—he knows that it is to use to clean the nose, he recognizes the object—he finds the word handkerchief when one puts it into his hand. The patient, therefore, is not able to make use of the optic memory-pictures for the language. This occurs mostly if the focuses are located on the border of the left occipital and temporal lobes and if they are so extensive that they interrupt the paths leading from both occipital lobes to the sound-memory center. Mostly there exists alexia, hemianopsia and frequently sensory aphasia. In one case word deafness was not present, also hemiopia is not necessarily present.

Preysing in Wulstein and Wilms "Textbook of Surgery" (page 195), says: "Local brain symptoms may be very plain in otitic abscesses of the brain and make the diagnosis absoutely certain, but they may also be absent when very large abscesses are present. In abscesses of the left temporal lobe (in right-handed patients), we may find the symptom of amnestic aphasia. The patient may say for what purpose an object may be used, but he cannot find the name of the object. If the name of the object is pronounced for him, the patient repeats it."

Our patient, also, mixed up the words teeth and feet. According to Bing (Basel), this is a paraphasia. It occurs because we unconsciously make the word first sound internally by aid of the sound-memory center (sensory speech center), and then we pronounce it. If this center does not work, wrong words may easily be produced.

Oppenheim (page 838) mentions the following symptoms under conduction-aphasia:

Understanding for speech } present.
Understanding for writing }

Voluntary speech } present, but paraphasia.
Loud reading }

Voluntary writing } present, but paragraphia.
Writing upon dictation }

Repeating of speech, more or less disturbed.

The defects in our patient fit somewhat in this category.

Koerner, "Otitic Diseases of the Brain," etc., in 1896, mentions that Schmiegelow found in 54 cases of left otitic temporal lobe abscesses 23 cases (=42 per cent) exhibiting speech disturbances. He says the patients frequently use wrong words or call objects by false names (conduction aphasia) and that the patients do not find the names of the objects although they know what they are used for.

He mentions that Oppenheim and Pick have shown the optic aphasia. The patients see an object but cannot name it. The location of the disturbance is assumed to be in the posterior part of the second and third temporal lobe.

The disappearance of speech disturbances after evacuation of the abscess may be explained by the fact that the brain surrounding the abscess is only temporarily diseased, either by increased pressure or edema. Koerner quotes v. Bergmann as follows: "The abscess increases the pressure in the cranium by increased pressure of the cerebrospinal fluid everywhere where this fluid lies in the arachnoideal sinus and the lymph-spaces of the brain. The pressure is also transmitted, unevenly, through the "hard soft" mass of the brain so that the more adjacent parts are affected the most. To this must be added the influence of the inflammatory edema which surrounds the abscess."

In otitic temporal lobe abscesses, says Koerner (1908), there is frequently a lesion of the capsula interna mostly with paresis of the contralateral extremities, rarely contralateral paralysis. There are contralateral spasms and convulsions and tonic spasms on the other

side. Besides, there are pareses, rarely spasms of the facial on the other side, sometimes contralateral hemianesthesia and homonymous bilateral hemiopia.

Dr. Goerdt—Dortmund (Archiv fuer Ohren Nasen und Kehlkopfheilkunde, Vol. 98, August, 1915, page 104, etc.), describing a cured case of abscess of the temporal lobe with rupture into the lateral ventricle, says:

"Patient, female, 16 years old, suffered from middle ear suppuration on both sides since she was three years old. On the right side a radical operation was performed and the dura extensively exposed. After a few days, severe headache appeared again, pulse 52. Babinski positive on right side. Slight paresis of right arm and right leg. Amnestic aphasia. When handkerchief is shown to the patient she does not find the name, but says that one uses it to clean the nose. There is slight tactile optical aphasia. A pencil placed into the left hand is called a little stick whereas it is immediately recognized as a pencil in the right hand. A key felt by the left hand is not recognized, but is recognized by the aid of the right hand. A temporal lobe abscess on the left side was evacuated, yielding about 6-8 tablespoonfuls of pus besides two tablespoonfuls of cerebrospinal fluid."

David Whitney Building.

Secondary Syphlitic Lesions of the Tongue. C. SAISON, *New York Med. Jour.*, Sept. 16, 1916.

The most frequent syphilide of the tongue is the mucous patch and the commonest site for these patches is the dorsal aspect and borders of the tongue, less frequently on the tip and inferior aspect. Besides the projecting patches the top of the tongue is the seat of more or less deep fissures, with callous, white, punched out borders. The ulcerating form is found more frequently on the borders of the tongue, particularly where there is a point of irritation. Lingual mucous patches may be transformed into vegetations, although rarely. There are also the tubercular syphilide and intermediary late lesion. This latter is more indurated, with very irregular borders and occurs on the back and edges of the tongue. The fissures are deeper and never assume the opaline appearance of the mucous patch. P. F.

DOUBLE CAVERNOUS SINUS THROMBO-PHLEBITIS SECONDARY TO MIDDLE EAR INFECTION WITHOUT INVOLVEMENT OF THE MASTOID OR THE OTHER VENOUS SINUSES.*

DR. CLAUDE G. CRANE, Brooklyn, N. Y.

A. D., male, age 31, occupation, lawyer; was first seen March 11, 1916. The patient was brought to my office by his attending physician, Dr. A. S. McBurney, of Glen Cove, New York. The previous history presented no feature of interest.

On March 8, he began to have pain in the left ear. The pain continuing, on March 10, Dr. McBurney, under chloroform anesthesia, incised the left ear drum, but obtained no pus. The examination of the patient when first seen, March 11, 1916, presented the following: The right ear was normal. The left ear showed some blood in the external auditory canal. The drum showed a free opening, but there was no discharge visible or obtainable on the cotton wound applicator. A culture was taken with a small platinum wire through the perforation in the drum. There was no evidence of mastoid involvement. The patient at this time had little or no pain. No headache or tenderness was found at any point. The temperature was normal and had been since the beginning of the attack. Examination of the nose revealed no evidence of nasal sinus infection. The throat showed some congestion of the pharynx and tonsils, but no evidence of localized infection. Douching of the left ear every two hours was prescribed and the patient returned to his home. Dr. McBurney reported over the telephone the following afternoon and stated that pus was discharging from the ear for the first time and that the patient's condition otherwise was the same. On the morning of March 15, Dr. McBurney reported that the patient was having considerable pain in the left side of the head and that the temperature had gone above normal for the first time on the night of the twelfth, at which time it had become 103 degrees, and had remained so since. There had been no chill at any time or a drop in the temperature. Arrangements were made at once to have the patient brought to the hospital.

*Read before Section of Otology, Rhinology and Laryngology of the Medical Society, County of Kings, May 18, 1916.

The patient entered my service at the Brooklyn Hospital at 2 p. m., the same day. On admission the patient presented the following on examination: The general appearance of the patient was that of a man moderately ill who had had little sleep for several days. The auditory canal on the left side showed a moderate amount of pus. The canal wall showed no evidence of extension posteriorly. The opening in the drum was free. There was no evidence whatever of mastoid involvement. There was some swelling in the front of the left ear. There was marked swelling in the region of the ramus of the jaw on the left side and the fauces presented a firm swelling involving the soft palate and region external to the left tonsil. There was no evidence of infection of the left tonsil and no pain or tenderness in the region of the swelling internally or externally. In fact, the patient stated that he had no pain whatever and that he had not had any headache at any time. The swelling both internally and externally was an edema rather than an inflammatory swelling. The right ear was normal. The nose, eyes, heart, lungs, abdomen and extremities presented no feature of interest. The temperature, pulse and respiration on admission were 103 4/5, 150 and 20 respectively. Soon after admission a vaccine made from the culture taken on March 11, was given. The culture showed a pure staphlycoccus albus. Although the swelling in the left fauces did not appear to be inflammatory, it was incised deeply. Aside from very free bleeding nothing came away. A culture through this incision was sterile.

Urine analysis was as follows: Sp. gr. 1027; color, amber; reaction, acid; albumen, trace; sugar, none; microscopic, a few white blood cells and granular detritis.

The blood picture on admission was as follows: White cells, 19,600; polynuclears, 83 per cent; lymphocytes—large, 6 per cent; small, 10 per cent; eosinophiles, 1 per cent.

Although there was no evidence of mastoid or sigmoid involvement, I advised exploratory opening of the mastoid and exposure of the sigmoid sinus. There was considerable objection to operating at this time and with such an indefinite picture I did not feel justified in urging operation.

During the first night in the hospital the patient complained of pain in the left ear which, however, had all disappeared by morning. He was restless and sleep was induced by a hypodermic of morphine sulphate. The irrigations showed some discharge. The patient also complained of considerable pain in the

left shoulder and the left elbow, but nothing was found on examination. During the first twenty-four hours in the hospital the patient's condition remained unchanged. The temperature, pulse and respiration were the same as on admission. There was moderate discharge from the ear. The examination of the ear showed no change. The swelling of the left fauces and in the region of the left ramus remained the same. The swelling in front of the lobe extended forward to the malar region. There was no headache, chill or drop in temperature. The mental condition was excellent. Some diplopia was noted. The blood picture on the sixteenth was as follows: White cells, 18,400; polynuclears, 83 per cent; lymphocytes—large, 7 per cent; small, 7 per cent; eosinophiles, 3 per cent.

The morning of the second day, the seventeenth, x-ray pictures of the head were obtained which showed the nasal sinuses to be absolutely clear, the mastoid normal and no lesion whatever was demonstrable. The x-ray plates were taken by Dr. Charles Eastmond and were perfect. Following the taking of the pictures the temperature rose to 104 degrees, but soon dropped to 102 2/5. With this exception the temperature, pulse and respiration on the second day were the same as on admission. Some bloody discharge from the ear was noted. The mental condition was satisfactory until twelve o'clock of the second day when the patient became irrational. When I saw him at 1 p. m., his condition had changed materially. He was apathetic and was aroused with difficulty. The left eye presented the following: Proptosis, chemosis, ptosis, immobile globe and the pupil was contracted and did not respond to light. This was a clear picture of venous obstruction. A diagnosis of obstruction of the covernous sinus was inevitable. We were able to account for the edema of the left fauces and of the region of the left ramus for the first time.

The picture here presented is most unusual. The pterygoid venous plexus pours a small part of its blood into the cavernous sinus, but most of it flows into the internal maxillary vein. The ophthalmic vein pours most of its blood into the cavernous sinus and only a small part of its contents flows into the facial through the angular vein. One would expect in the presence of obstruction of the cavernous sinus, the eye to give evidence of venous obstruction before it was manifest in the region of the pterygoid plexus. In this case, however, the pterygoid plexus obstruction showed very markedly on admission to the hospital and the left

eye did not give any evidence of venous obstruction until practically forty-eight hours after admission. It was also noted that the edema of the pterygoid plexus region became somewhat less on this day. This was due to the establishment of collateral circulation. In the total absence of mastoid or lateral sinus evidence it was decided not to operate as the cavernous sinus did not offer much hope of a successful outcome. The temperature, pulse and respiration remained the same. The patient remained in a semi-conscious condition during this period of twenty-four hours.

Twenty-four hours after the left eye showed signs of venous obstruction the right eye was in the same condition. At this time both globes were immobile, pupils contracted and even, no response to light, marked chemosis, protosis and ptosis. The patient was unconscious. Profuse sweating was noted for the first time. Examination of the eye ground by Dr. C. H. Hargitt showed the following: Time of examination, 4 p. m., of March 18. Marked chemosis of bulbar conjunctiva of both eyes. Pupils contracted. Globe prominent. Disks, M. right eye, retinal veins markedly engorged, arteries somewhat larger than normal; one hemorrhagic spot to temporal and lower side of disk. M. left eye, caliber of veins practically normal, no hemorrhages noted, no marked edema of optic disk. Lumbar puncture showed a clear fluid and no increase of pressure. Chemical analysis and culture of spinal fluid was negative. The patient had marked constipation and a foul breath during the entire period of his illness. Dr. G. R. Butler saw the patient in consultation at this time. As we entered the patient's room he had a short convulsion confined to the right side and following this a total hemiplegia of right side was noted. Up to this time there had been no evidence of paresis other than noted in the eyes. The only diagnosis that was clear up to the appearance of the hemiplegia was the double cavernous sinus thrombosis. There had been at no time any evidence of meningeal or brain involvement. A total hemiplegia in such a case could be due to an abscess of the temporo-sphenoidal lobe secondary to the middle ear infection, causing pressure upward on the cortical motor area, or the extension of such an abscess directly inward and involving the internal capsule. Such a paralysis could also be due to a second abscess involving the internal capsule, or crus cerebri. The abscess of the crus would cause hemiplegia of the opposite side and a motor oculi paralysis of the same side. An abscess of the

internal capsule would cause a hemiplegia of the opposite side. An abscess of the temporo-sphenoidal lobe large enough to cause pressure upward on the motor tract to such an extent as to cause a hemiplegia would give symptoms of increased intracranial pressure. The usual brain abscess secondary to middle ear infection is located in the temporo-sphenoidal lobe. If an abscess were responsible for the hemiplegia in this case it was fair to assume that there was one in the temporo-sphenoidal lobe and a secondary one in the internal capsule. The sudden onset of the hemiplegia, however, would indicate a sudden and complete shutting off of the function of the entire motor area, and this would be best accounted for by an embolism of the middle cerebral artery, which with its branches, supplies the entire motor area. With the hope of finding an abscess the patient was operated.

The usual mastoid operation was done. The mastoid was absolutely free of infection. The mastoid antrum was also free of infection. A small amount of pus was found on entering the cavity of the middle ear. There was no evidence that the bone of the mastoid process, antrum or tympanum was involved. No breaking down or softening of the bone was found. Exposure of the lateral sinus showed it to be normal. The operative field was thoroughly irrigated and protected and preparation made for a sterile operation. The usual curved incision was made to uncover the dura over the temporo-sphenoidal lobe. On exposure of the dura over the lobe it was found to be of normal appearance and no increase of pressure was evident. The temporo-sphenoidal lobe was carefully explored for a possible abscess. None being found the frontal and parietal convolutions of the motor area were explored without result. The searcher was then inserted into the internal capsule, but again without result. The patient's condition at this time was very precarious and he was removed at once to his room. Before going to the operating room the temperature, pulse and respiration was 103 2/5, 160 and 55 respectively. Two hours after the operation the temperature, pulse and respiration was 106 2/5, 150 and 50 respectively. The patient died twenty-four hours after the brain exploration, without regaining consciousness.

Autopsy: Confined to the head. Examination of the temporal bone showed no evidence that the bone was softened or broken down at any point. The venous sinuses were free of demonstrable infection, with the exception of the two cavernous sinuses

and the circular sinus. The dura was normal. The brain was normal. The middle cerebral vein and the great anastomotic vein of Trolard were filled with pus in their entirety and could be traced along their course as they passed inward along the fissure of Sylvius to enter the cavernous sinus. No embolism of any of the arteries or veins was demonstrated. I believe, however, a more careful examination would have revealed an embolism of the middle cerebral artery. We have then as the only lesions demonstrated at autopsy an infection of the middle ear cavity in which the bone was not involved, a thrombo-phlebitis of the middle cerebral vein, the great anastomotic vein of Trolard and a thrombo-phlebitis of both cavernous sinuses and of the circular sinus.

We have now to connect our clinical picture with our findings at autopsy. We have previously explained the eye picture and the edema of the fauces and the region of the ramus of the jaw, as due to the thrombo-phlebitis of the cavernous sinus. The infection of the cavernous sinuses was brought about in the following manner. The infection in the middle ear passed through the veins of the diploe or the veins of Breschet which are numerous in the petrous portion of the temporal bone. These veins connect the veins outside of the skull with the venous sinuses through the numerous cerebral veins. The veins of the diploe in the region of the tympanum connect with the inferior cerebral veins. The middle cerebral vein, which was found on autopsy to be filled with pus, is the largest of the inferior cerebral veins and it pours its blood directly into the cavernous sinus. The vein of Trolard commences on the parietal convolution and passes horizontally along the fissure of Sylvius and pours its blood into the anterior part of the cavernous sinus. This vein also receives blood from the veins of the diploe. It was through these veins that the infection in the middle ear found its way into the cavernous sinus of the same side, and the circular sinus made the further progress to the other cavernous sinus inevitable. A pure culture of the staphylococcus albus was recovered from these two veins and from the cavernous sinus. It will be remembered that this was the only organism recovered from the middle ear. When one realizes the numerous connections between the many veins within the skull with each other and with the venous sinuses and with the veins of the diploe it is surprising that we do not have a picture such as this case presented more frequently. It is fair to assume that an autopsy would

demonstrate that such was the case in many of the cases we see in which the path of infection has not been clear from the clinical picture. For instance, one or two emissary veins of considerable size pass through the foramen ovale and connect the cavernous sinus with the pterygoid plexus and occasionally a small vein which passes through the foramen of Vesalius joins the cavernous sinus.

The hemiplegia in this case can be accounted for as previously stated in only one way,—by an embolism of the middle cerebral artery. The internal carotid, in its cavernous portion, lies within the walls of the cavernous sinus. It is not difficult to see that an infection involving the cavernous sinus would readily cause an inflammation of the walls of the cavernous portion of the internal carotid. With such an inflammation an infective thrombus could form on the inner wall of the artery. With such a thrombus formed, an embolus from the thrombus would be most likely to pass directly into the middle cerebral artery, as this is not only the largest branch of the cavernous part of the internal carotid, but it is the terminal branch. As this artery supplies all of the blood for the motor area, an embolus at this point would cause a total hemiplegia of the opposite side such as we had in this case.

A review of the literature of cavernous sinus thrombosis reveals a number of interesting facts.

There is considerable difference in the figures given as to the number of cases reported to date. Adair-Dighton, of Liverpool, states that he had examined the literature as far back as 1883, and although he had found fifty cases reported, not one had recovered. Dwight and Germain refer to one hundred and seventy-eight published cases in which fourteen had recovered, and reported four of their own. Since the report of Dwight-Germain, twenty-seven cases have been reported up to 1909, a period of seven years, which is certainly not a large number. These twenty-seven were reported by Edward Jackson, two cases; Chance, two cases; Ellett, three; Risley, two; Day, one; Finlay, one; Miles, one; Prefontaine, one; Neumann, one; Zeptmayer and Weisenberg, one, and Friedenburg, two. St. Clair Thomson in 1906 in the Transactions of the Medical Society, London, reported two of his own and forty others found in the literature, all due to sphenoidal sinus infection. Ballenger in his book published in 1908 stated that he had seen two cases and that he thought it exceptional for any man to even see two

cases. Thomas J. Gallaher mentions one hundred and thirty-four cases that had been reported. Since 1909, the following cases have been reported: Wendell Reber, Philadelphia, reported one case and stated that only seven in one hundred recover. Adair-Dighton reported one case. Ballance and Hobhouse reported one case and also reported a case occurring in 1907, not previously reported. H. P. Mosher, Boston, reported one case. Robert Lewis, Jr., reported one case. Alfred Braun, of New York, reported one case. John F. Barnhill in the same number of the same journal, reported one case. H. R. Johnson, of Fairmount, W. Va., reported one case. The index of the literature of 1915 does not reveal the report of a single case although such a report may have escaped the writer's notice.

The etiology groups these cases into three classes. The marantic cases in which we have an aseptic thrombus. The marantic cases occur in malnutrition, colitis, the puerperium, the cachexia of carcinoma and in nephritis. The traumatic cases result from injuries to the head with or without fracture of the bone. The infective cases form a considerable group and include by far the greater number of those that have been reported. Any infection involving the anterior segment of the skull may cause a secondary thrombosis of the cavernous sinus. The veins draining any part of this area may carry infection into the cavernous sinus through the pterygoid plexus, the facial and the ophthalmic together with their tributaries. In addition to this we may have an infection of the cavernous sinus secondary to an infection of the superior petrosal, lateral or sigmoid sinuses as well as the jugular bulb into which the inferior petrosal sinus opens. With this in mind it is amazing that so few cases of cavernous sinus infections have been reported. Cases have been reported secondary to a carbuncle of the neck, an adenoid operation, tonsil and peritonsillar infection, furuncle of the lip, etc. Any infection involving the orbital contents may be a direct cause, and a considerable number of such cases have been reported. An infection of any of the nasal accessory sinuses may be the direct cause. Secondary to ear infection it is brought about in one of the following ways: An extension of a middle ear infection into the mastoid with sigmoid and lateral sinus infection and hence through the bulb, inferior petrosal, or superior petrosal sinus to the cavernous sinus, or we may have the foregoing without the mastoid being apparently involved. The infection in the middle ear may pass through the veins of

the diploe to the superior or inferior petrosal sinus or there may be a breaking down of the roof of the tympanum and extension into the superior petrosal or as has been reported the tip of the petrous pyramid may become necrosed with an extension into the covernous sinus or finally it may occur as in the case reported in this paper. None of the cases reported, in which an autopsy was obtained, had a pathology similar to the case of the writer. St. Clair Thomson states that the sphenoidal sinus is responsible for the greater number of cases and following this, in order of frequency, the ear, ophthalmic veins and the pterygoid plexus. It is very rare to have only one sinus involved. In one hundred and thirty-four cases reported, in only three was the process confined to one side.

The most prominent symptoms are those involving the eye. In most cases a diagnosis is not possible until the eye picture shows itself. It is very essential that the diagnosis be made early if we are to operate on these cases. A knowledge of the anatomy of the cavernous sinus is all that is needed to explain the eye picture.

The cavernous sinus is triangular in shape and with few exceptions, lies on the lateral aspect of the body of the sphenoid bone, extending from the inner end of the sphenoidal fissure to the apex of the petrous portion of the temporal bone. Occasionally the sinus lies above the body of the sphenoid. The cavity of the sinus is traversed by numerous interlaced filaments which form a structure resembling cavernous tissue, from which fact the name is derived. Enclosed in the outer wall of each sinus are the third, fourth and the ophthalmic and superior maxillary divisions of the fifth nerve as they pass forward to the sphenoidal fissure and the foramen rotundum, and in the cavity of the sinus, covered only by its thin lining membrane are the internal carotid artery, the sixth nerve and a plexus of the sympathetic. Each sinus receives blood anteriorly from the ophthalmic veins and the pterygoid plexus as well as from several inferior cerebral veins and the great anestomotic vein of Trolard. The two sinuses are connected by the circular sinus and discharge their blood posteriorly into the superior and inferior petrosal sinuses. Frequently the first symptom is a motor paralysis due to pressure on the aforesaid nerves. At times there will be pain in the region supplied by the fifth nerve. Soon, however, develops those symptoms due to venous obstruction and increase of intraorbital pressure such as edema of the fatty tissue

and of the lids, chemosis, stasis within the eyeball and disturbances of vision due either to thrombosis of the retinal veins or compression of the optic nerve and subsequent atrophy. The edema due to the obstruction of the pterygoid plexus of veins is not often seen. In reviewing the literature I do not recall any case in which the pterygoid plexus was involved, but Macewen mentions it as an occasional symptom and it was present in one of his four cases. This case, however, had thrombosis of the sigmoid, cavernous, inferior and superior petrosal sinuses, and also of the superior ophthalmic vein, internal jugular and the antrum and posterior condylar veins. The septic symptoms are similar to those occurring in like infective processes in other venous sinuses.

The opposite sinus becomes involved in a few hours in most of the cases. In rapidly developing cases death ensues in from twenty-four to forty-eight hours. Some of the cases have been of slow development with periods of apparent quiescence during which a favorable prognosis seems justifiable. The quiescent periods however are brief and the fatal termination in these cases comes very suddenly. A septic pneumonia and enlargement of the spleen have been noticed in some cases.

Some of the cases that have been reported as recovering have probably been of the aseptic type. Of the cases that have recovered may be mentioned Stocker's case which was secondary to an orbital injury in which both cavernous sinuses and both eyes were involved. This case was first seen on January 14, 1895, and recovery was recorded on February 6, 1895. There resulted complete loss of vision in the injured eye. This was the first case of this kind ever registered as having recovered. The case of H. R. Johnson which was secondary to lateral sinus thrombosis recovered following operation on the lateral sinus. The vision in the eye affected was entirely lost. The case of Adair-Dighton following mastoiditis and lateral sinus thrombosis extending posteriorly to the torcular and below, the entire length of the jugular. Both eyes were involved. Following operation on the lateral sinus and the jugular, irritation from above downward was made and the author considers that the suction thus made at the opening of the inferior petrosal in the bulb, dislodged the clot from the cavernous sinus. The vision was not regained. Bircher's case, reported in 1892, recovered. This patient had a mastoid and following operation the symptoms of cavernous sinus thrombosis developed. The operation on the

cavernous sinus consisted in trephining above the meatus and cutting away the pyramid. At the apex of the pyramid pus was found and drained. The patient recovered. It is more than probable that this was an abscess case rather than a sinus infection. I have been unable to find the report of a single case which has recovered in which the cavernous sinus was actually opened and drained.

Very obviously, the only treatment that offers any hope of recovery is an operation that will adequately drain the cavernous sinus and at the same time not infect the middle fossa. Such an operation must be done at the first appearance of trouble in one cavernous sinus. A one-sided involvement if successfully operated at its onset offers some prospect of recovery, but when operated late or when both sides are involved, it is a hopeless procedure.

Macewen in his "Pyogenic Infective Diseases of the Brain and Spinal Cord," which is the best treatise that has been published on the subject, states that these cases are beyond surgical relief.

The following operations have been performed in the effort to successfully drain the cavernous sinus and effect a cure: Knapp, in reporting a case of cavernous sinus thrombosis, secondary to a sarcoma of the orbit, described the operation done on this case. The operation was done by Hartly and consisted in the Hartly-Krause operation for the removal of the Gasserian ganglion. This exposed the cavernous sinus and it was incised and a drain inserted. The patient died in four months. Bircher in 1893 reported opening the middle fossa by trephining and resecting the entire petrous pyramid, with the exception of the inferior wall of the carotid, and of course cutting the facial. He found pus at the tip of the pyramid. The patient recovered with facial paralysis. He did not identify the sinus and as previously mentioned it is fairly certain that he had to do with a brain abscess. Voss succeeded in incising the sinus by opening the middle of the fossa at the level of the base of the great wing of the sphenoid. He first sawed through the zygomatico malar arch before doing an osteoplastic operation. The patient died of meningitis.

In 1902, Dwight-Germain, of Boston, reported operating through the middle fossa following the Hartly-Krause technic for the Gasserian ganglion operation. The operation was done January 1, 1899, and the patient died six and one-half hours

later. Kronlein in devising his operation for the removal of a retrobulbar growth, thought it could be utilized to expose the cavernous sinus. He did a temporal resection, cutting a wedge-shaped piece of bone from the external bony orbital wall.

In 1905, Luc, of Paris, devised an operation in which he approached the lateral wall of the sphenoid through the maxillary antrum. He only experimented on the cadaver. Grunert considered opening through the nose the only reasonable route. Dwight-Germain believed that any attempt to open the cavernous sinus by an external operation through the sphenoid would endanger the carotid and they found no record of a successful performance. Dwight has reported a case in which he removed the right eye and the whole of the superior wall of the orbit and locating the sinus, curetted it. The patient died of meningitis in seven days.

H. P. Mosher, of Boston, in The Laryngoscope of August, 1914, reported a case which he had operated in the following manner: The outer and the posterior part of the orbit was exposed according to the method of Kronlein. The eye and the orbital contents were removed. An opening was chiselled through the orbital plate of the great wing of the sphenoid, the brain retracted upward and the cavernous sinus located and incised. The man died in a few days and the autopsy revealed that there was an abscess of the temporo-sphenoidal lobe which had not been diagnosed. The operation had not succeeded in opening the cavernous sinus. Mosher found that he had gone in a little too high and had missed the sinus. Mosher's experience shows the great difficulty of such an operative procedure in very skilled hands. The procedure, however, seems to the writer to offer the best opportunity for a successful incision and drainage of the cavernous sinus with a minimum risk of a subsequent meningitis.

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DOUBLE CAVERNOUS SINUS THROMBOSIS FOLLOWING OBSCURE MASTOIDITIS.*

DR. W. T. PATTON, New Orleans, La.

The literature on this subject is not abundant by any means. Dwight and Germain append an extensive bibliography to their report of cases, and were able to find 178 cases, with their 4, making 182. I would refer those interested in the literature to this article: (1) The importance of the condition lies in its great mortality, only 14 of these cases recovering. In septic cases the prognosis is always bad. Since this collection of cases others have been reported by Day, Lodge, Finlay, Ellett and several others.

The cause of this condition, i. e., septic thrombosis of the cavernous sinus, is any infected lesion in the area drained by the ophthalmic vein or its branches. Pustules on the face, nostrils, eyelids, etc., purulent affections of the accessory sinuses, nasal, pharyngeal or buccal cavities, facial erysipelas, infected wounds of this region, etc., may be the cause. Also from mastoiditis through lateral sinus into petrosals, then cavernous sinus.

The symptoms naturally divide themselves into (1) the local and (2) the general. The general symptoms are those of sepsis under any and all circumstances. The local symptoms may, following McEwen's scheme, be divided into (a) those due to venous obstruction, and (b) those due to pressure on the nerves. Venous obstruction causes edema and chemosis of the affected area, viz., the orbit, the skin of the nose, forehead, cheek and sometimes fauces, pharynx and neck. The exophthalmos, which is a prominent symptom, is due to engorgement of the tissues of the orbit.

Pressure on the nerves causes characteristic symptoms. The nerves involved are the second, third, fourth, sixth and the ophthalmic division of the fifth.

The visual disturbances are usually very marked, due to pressure on the optic nerve and edema of the retina, while the motor disturbances are most pronounced in the parts supplied by the third. The dilated pupil, divergent squint and ptosis have been seen in cases reported. The ophthalmoscope shows dilated and tortuous retinal veins and edema of the retina. The disturbances due to pressure on the fifth nerve are variable.

(1) Boston Medical and Surgical Journal, May 1, 1902.

A very important and characteristic symptom arises from the fact that while the trouble is unilateral at first, the thrombus soon spreads to the other sinus, and obstruction and other symptoms appear in the areas drained by it. The edema of the lids of the second eye, beginning at the inner canthus, and not due to direct extension, the parts at the root of the nose lying between the eyes being normal, is very characteristic.

The prognosis in septic cases, is, I believe, uniformly bad. In one of the series reported by Dwight and Germain, operation was performed and they think the results are promising. Since the prognosis otherwise is absolutely bad, it seems to me proper that operation should be tried. Other than this the treatment is supporting and symptomatic.

This case I am reporting is of interest not only on account of sinus involvement, but also because of the peculiar onset and later sudden involvement of the eye.

Miss F., age 44, healthy all her life; never any serious illness; malaria several times.

May 17th. Patient complained slight chill and vague pains through temporal region and ear, next day felt fairly well, only slight pains over left side of head; this continued to grow worse; patient called her family doctor who prescribed aspirin, a purgative and gave some carbolic glycerin drops to put in ear; condition continued to grow worse; pain most severe in temporal region; occasional pain in ear and mastoid. Patient had to have morphin before could sleep. Claimed she felt better sitting up. I was first called to see case May 27th. Ten days after trouble began.

Examination: Left ear, canal normal, drum membrane normal color, apparently perfectly normal, possibly slight redness along handle of malleus. Patient complaining great deal of severe, unbearable pain in temporal region, no pain in ear. Mastoid on pressure tender over tip, no pain over rest of bone. Percussion of bone causes more pain high up in temporal region. Nose and throat normal. Temperature 101. Pulse 90. Hearing about normal.

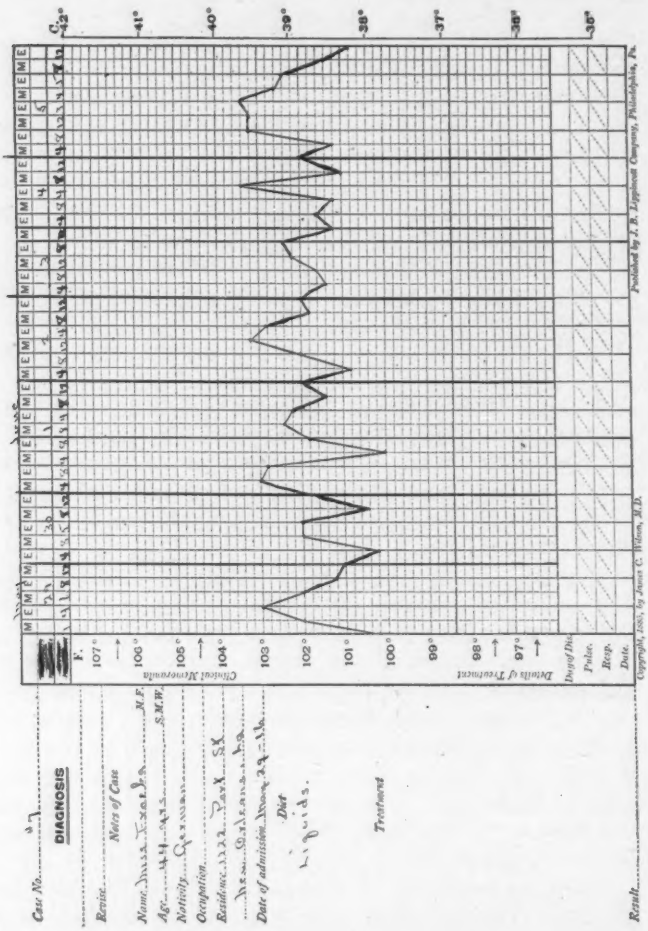
I advised ice bag to side of head and observation 24 hours.

May 28th. Patient slightly better, less pain and had fairly good night; temperature 101.

May 29th. Suffering great deal, advised removal to hospital. Admitted Presbyterian Hospital May 29th. 3 p. m., blood count, total white 17,000. Wassermann, negative. Urine, negative. Temperature 102. Patient suffering less. Twitching of extremities, mas-

toid tip very tender, ear drum normal. Advised exploratory mastoidectomy.

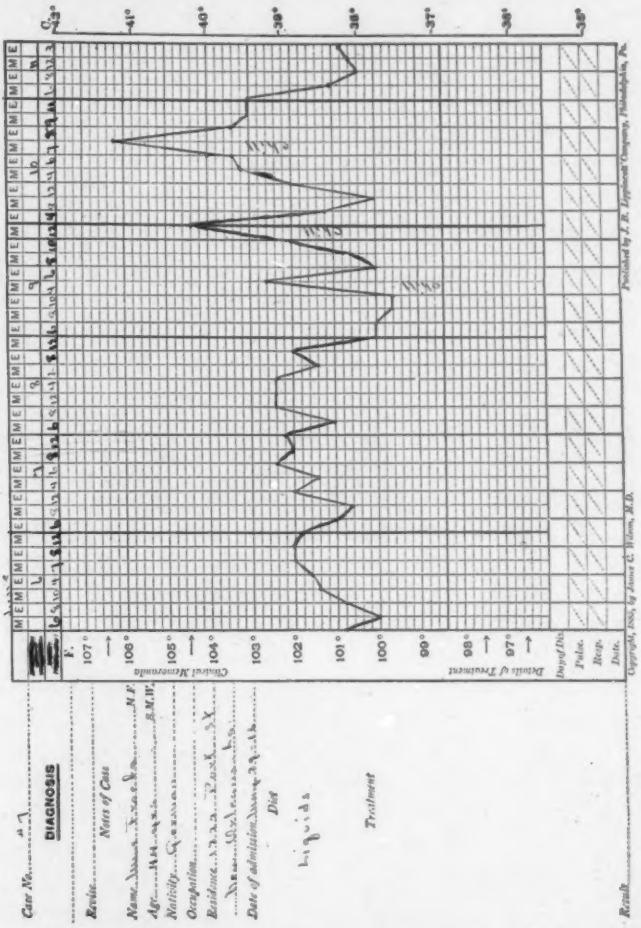
May 30th. 9 a. m., mastoid cortex removed under ether anes-



thesia, mastoid found badly necrotic and full of pus and granulations, dura found exposed over entire tegmen antri, extending well forward, exposing dura about size of a half dollar, not under tension. Sinus not exposed. Mastoid thoroughly cleaned to hard

bone in all directions. Iodoform strips put in and patient left operation room in good condition.

May 31st. Patient feels much better, claims has had no pain in

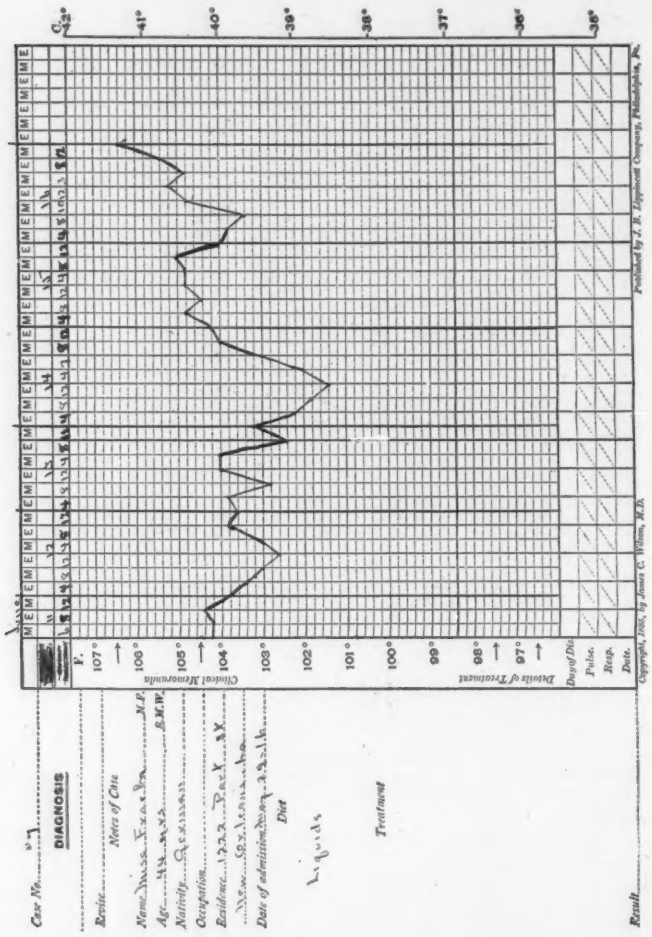


temporal region; only complains of soreness in neck, passed good night, nourishing well, no twitching.

June 1st. Resting nicely, temperature 102, no pain.

June 2nd. Claims blindness and great pain in left eye.

Oculist consulted—reports: Hypopyon left eye, chemosis lids, exophthalmus, conjunctivitis. Mastoid wound dressed, healing nicely, very slight discharge.



June 3rd. Lids left eye greatly swollen, exophthalmos marked, hypopyon less. Only complaining of eye. Diagnosis of probably infected embolus of eye and thrombosis of cavernous sinus. Blood culture made at this time negative, white count 24,000.

June 4th. Right eye paining and lids swollen and chematic, evidently thrombosis has extended through circular sinus and right cavernous sinus is now involved.

June 8th. Patient continues about same, temperature ranging 100-102. Mastoid clean, only pain in eyes which are now swollen and secreting freely, lids very edematous, patient nourishing well.

June 9th. Had first chill 8 a. m. Temperature went up to 102.5. 8 p. m., second chill, temperature 104.

June 10th. 3 p. m., severe chill, temperature by axilla, 4 p. m., 107.

June 16th. Continued to run septic temperature, with chills. Conscious up to June 10th. Since that time, only rational at intervals; died 3 a. m., June 16th.

The points of interest in this case are first, evidently there was quite a little irritation of meninges.

Second. At no time was there apparent involvement of middle ear until after mastoidectomy.

Third. The meningeal irritation cleared up after mastoid was drained.

Fourth. Sudden involvement of left eye, first with pus in anterior chamber, later exophthalmus.

Fifth. As was to be expected, involvement of right eye making a typical picture of double cavernous sinus thrombosis.

This case is reported because the condition is not a common one, and in hope that in discussion we may add something which may hold in treatment of this condition, cavernous sinus thrombosis, which is practically always fatal condition.

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Dr. Chevalier Jackson has accepted the Professorship of Bronchoscopy, Esophagoscopy and Direct Laryngoscopy at the New York Post-Graduate Medical School and Hospital. Dr. Henry Lowndes Lynah of New York has become associated with Dr. Jackson in this department. This is the first time that a department in this specialty has been created in this country.

EXTENSIVE CHOLESTEATOMA FOLLOWING THE LUC-CALDWELL AND KILLIAN OPERATIONS SIMULATING SARCOMA.*

DR. VIRGINIUS DABNEY, Washington, D. C.

The phlegmatic temperament and stoicism of the patient whose condition I am about to describe might account for the fact that he sought relief for nothing more serious than a tendency to take cold and an intermittent stoppage of his nasal respiration; whereas, he was suffering from a virulent suppurative disorder of the antrum and ethmoid of not less than a year's duration, perhaps much more. The instant I glanced at his face, that of a well nourished man 42 years of age, I observed a marked exophthalmos of the left eye, which condition had not only escaped his notice, but also that of an alleged specialist two days before. The apparent sinus infection was impossible of differentiation as the left naris was almost completely blocked in its anterior portion by an angular deviation of the septum, which was a source of much embarrassment to me in all my subsequent intranasal work. However, I was able to elicit with a small probe necrosis and polyp formation in the middle strait, though no pus came away despite the most searching and repeated irrigation. The probing seemed to cause a slight oozing of blood which continued, slight but persistent, for three days, at the end of which I was hurriedly sent for to find him delirious, though the temperature was only 103° F. The exophthalmos was worse, chemosis of the eye was extensive, and the lids were so swollen as to be closed, while a thin stream of pus trickled out of the inner canthus. The probing could hardly have been responsible for this transformation after so long an interval, and it now seems likely that the abscess was on the point of rupture when he was examined three days before.

At operation, the instant an opening was made in the canine fossa, pus in great quantity and of overpowering fetor escaped under pressure. There were also some shreds of tissue which floated out at the first gush, but none was found in the free cavity of the antrum. This point is of interest in view of the

*Read before the American Laryngological Association, May, 1916.

later developments in this case. While I had intended to proceed to the Killian operation after clearing the antrum, I found that almost the entire nasal wall was so necrotic as to require removal, which procedure allowed me to exenterate most of the ethmoid cells as well. This I was able to do so thoroughly, by keeping a forefinger in the nostril and my curette in the canine fossa wound and through into the middle naris, that I thought the results might obviate the Killian procedure. I was still further moved to this conservative view as the patient's condition was not at all reassuring at the end of the ethmoid operation. The x-ray picture was interpreted for me as showing a pan-sinusitis of the left, though I was not at all convinced

Fig. 1. Taken three weeks after opening abscess in cheek. Dotted line indicates incision, outer extremity of which became fistulous (x). Shows good cosmetic result of Killian operation. No bulging of cheek at this stage; no odor, or any manifestation of cholesteatoma. Area in circle, the dusky, purplish appearance, brawny to the touch, which followed abscess and never disappeared. (White spots due to adherent cotton from dressing.)

by my own examination of it, as such evidence alone has so often proved deceptive and unreliable in my experience. In three days all his symptoms appeared to recede, including the inflammation and position of the eye, and the temperature fell to 100° F. However, the fourth day his fever reached 102.2° F., the eye became much congested and the chemosis again slightly evident. The next day, the fifth since the antrum operation, his condition became so alarming that I did a Killian operation, which exposed an eburnation of bone such as I have never seen in the ethmoid region, parts of which, of course, could not be reached effectively through the antral wound. The frontal sinus was diseased only to the extent of a thickened

lining membrane and contained no pus. The naso-frontal canal was normal in size and direction. The great thickness and density of the overlying cortex doubtless caused the shadow which the roentgenologist interpreted as an evidence of frontal sinus abscess, on the existence of which he was most insistent. However, the removal of the deeper lying anterior and posterior ethmoid cells, which had escaped the previous operation, required a chisel, one of which was broken in the procedure. The diseased bone included a portion of the nasal process of the

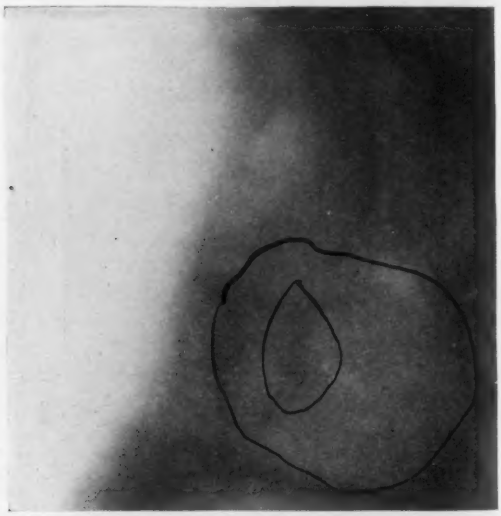

Fig. 2. Large circle indicates cholesteatomatous mass; small circle, two loose sequestra. Taken two months after Killian operation.

superior maxilla and its brim of the orbit. While these pieces of bone were themselves of ivory hardness, the subjacent bone was friable and plainly necrotic. There was not a trace of anything resembling cholesteatoma in the nares or antrum, which latter was again explored. In ten days the operation seemed a perfect success, and I felt justified in regarding it an ideal cosmetic and functional result, as there had been no discharge after the eighth day after operation, and the wound had healed by first intention without deformity. The only unsatisfactory result was a stubborn headache. On the eleventh day, when I had intended to send the patient home, I noticed a brawny red

swelling below the eyelid, which was intensely painful on pressure. An extra dose of autogenous vaccine (pneumococcus) which he had been receiving for ten days, seemed to improve his condition, which began to assume the characteristics of post-operative erysipelas, none of the classical symptoms being lacking, except the very high temperature. This discrepancy, I assumed, to be due to the vaccine, given him the night before, which I have seen more than once control the temperature of a post-operative erysipelas. However, I now believe it was a type of acute necrosis of bone, which Osler says he has seen several times necrosis of bone, which Osler says he has seen several times mistaken for erysipelas. Two days later extensive infiltration

Fig. 3. Taken two months after Killian operation; exposure from chin to vortex. Note cholesteatoma in left nose and pressing bony septum so far to right as to encroach well upon right nasal cavity.

and fluctuation led me to incise the swelling, which yielded an ounce and a half of pus of the same nauseating fetor, and due to the same organism as was found in the antrum and other sinuses, a pure growth of pneumococcus. I was still of the opinion that I was dealing with an erysipelas, and the floating particles of cellular tissue which were scattered throughout the pus made me think it a phlegmonous type. That part of the incision which lay over the middle of the malar bone did not heal, and boric acid irrigations were made through this fistula and through the nose. In two weeks he went home in fair condition, though there was some odor about the wound and the fistulatous opening exuded a sticky, gelatinous material of a

mucoid appearance. For the next two months the dusky redness that had appeared at the beginning of the cheek abscess, extending for an inch below the lower eyelid, gradually spread till it reached the lower border of the inferior maxilla, while the whole side of the face, from the eye to the same point swelled slowly till the sulcus between the nose and the malar region was obliterated, the bridge of the nose being on a level with the upper margin of the malar bone, and the nose thrust sharply to the opposite side. The whole swelling was board-like in its feeling on palpation. Meanwhile frequent, profuse, spontaneous hemorrhages were occurring five or six times a day, lasting fifteen or twenty minutes and unprovoked apparently by any trauma or exertion. In fact, they generally occurred while the patient was sitting quietly talking or reading. The great deformity, hemorrhages, location of the swelling (antrum), wooden feeling to the touch and the x-ray showing of a tumor-like mass in the side of the face all were strong presumptive evidence of sarcoma. Laboratory tests never showed any malignancy, nor did they ever show the presence of tuberculosis or syphilis, despite great care and frequency of examination. Intensive x-ray therapy was tried without success, and finally an exploratory operation was done with the following unusual findings: Heavy pressure on the cheek expressed from the nose and the fistula in the malar bone a stiff jet of grayish, putty-like material of very foul odor, while exploration with one finger in the nose and another in the cheek showed that the entire floor of the orbit, its entire inner wall, all of the outer wall of the antrum, and all of that part of the nasal wall which had been left at the previous operations, together with the inferior turbinate, and all of the malar bone save its outer one-third had been completely eroded in two months' time. All this osseous tissue had melted away leaving two small sequestra loose in the cheek as the only remnants. The sensation imparted to the exploring finger was that of an irregularly shaped cavity lined with a smooth, velvety membrane, and no roughness was encountered. This common cavity, bounded below by the alveolar process, above by the globe of the eye, in front and internally by the nasal septum, behind by the slender rim of malar remains and palate bone and externally by the cheek muscle, was filled to overflowing with a putty-like mass, which was later determined to be true cholesteatoma. The hemorrhage accompanying its removal was great and somewhat hard to control.

From time to time the patient's eye shows chemosis, and the discharge increases in amount and in fetor, but increasing the frequency of the irrigations and confinement to bed causes the disappearance of the acute symptoms. His temperature curve has never been of much interest, ranging from 97.5° F. to 100° F. In view of the lack of positive proof of malignancy, and the absence of any adenitis, his present condition may be termed that of asthenia, as he seems to be growing slowly weaker, though there has been no return of the cholesteatoma in five months. At no time has the sphenoid shown any disease, though it was thoroughly opened and inspected twice, which is rather remarkable in view of the widespread degeneration in the sinuses. The treatment has included the routine use of non-irritating irrigations, the internal administration of phosphatic emulsion of cod liver oil, Blaud's pill combined with intramuscular injections of cacodylate of soda and injection of autogenous vaccine.

The x-ray pictures in this one case crystallize my experience and feeling on such means of diagnosis, as I have come to regard them as highly valuable for anatomic reasons, and believe that they should always be made and studied before every sinus operation. On the other hand, I think that as a guide to the determination of the contents of any of the accessory nasal sinuses, they are often exceedingly deceptive and never to be given preference over other means of diagnosis. A rhinologist cannot become as gifted in the reading of these plates as the roentgenologist and must trust much to his suggestions, wherein lies the danger; but my own experience has been so unfortunate in this field of differential diagnosis that I have come to accept these pictures as merely confirmatory or suggestive. On two different occasions I have seen x-ray plates of the antrum of Highmore explained as diagnostic of empyema when the true condition was merely inflammatory thickening of the lining membrane following an acute empyema of one and two years before, respectively.

1633 Connecticut Avenue.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Meeting of March 22—(Continued.)

DR. HENRY L. LYNAH, Chairman.

DR. ARROWSMITH, referring to Dr. Coakley's remarks, said that he had had a case in the Brooklyn Eye and Ear Hospital. The patient was a girl, 17 years of age, who had been in this country for six months, and had her first symptoms, which she attributed to a cold, on the voyage across the Atlantic. She came in very shortly after the six months was up, and showed a very distinct nasal obstruction, masses in both nostrils, and a considerable amount of infiltration in the upper part of the larynx. The diagnosis was established by tissue section and by identification of the organism. Dr. Murray made a vaccine which was given to her regularly for three or four months. She improved to such a degree that to all clinical appearance she was perfectly well; the nasal obstruction had disappeared and she had a good voice. She was then allowed to go home and return for treatment. She was utterly irresponsible and did not know much English, and her relatives not understanding the gravity of the case, she did not return for two months, when the condition was almost as bad as before.

This case, however, had convinced him that vaccine offers the best prospect for such cases of any treatment. Dr. Murray had looked after it from the laboratory standpoint with the most minute detail. Every point was controlled by the laboratory, and if the girl had been kept under observation for three or four months she would probably have been made entirely well. She was well when she left the hospital. After her return, she was seen once or twice, but she finally returned to her home on the other side.

He wished to have this case on record, for the result obtained was contrary to that of other cases treated by vaccines. It was not convincing, but the treatment had not been followed up.

A Case of Hemiplegia Occurring Immediately after Tonsillectomy Under General Anesthesia. DR. WILLIAM A. SCRUTON.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. HASKIN did not think it was a case of embolus for it would have had to follow through the lungs before it got to the brain, and he was inclined to believe that the child was suffering from hysteria. He had seen such cases before in children of that age. He did not think there was any actual nerve lesion, but that it was a neurasthenic condition, which would probably disappear. He had had a somewhat similar experience with a patient upon whose nose he had operated to remove a

band of cicatrix. The operation was performed under novocain and adrenalin, and after it was finished and he observed the patient she was doubled up under a complete contraction of all her reflexes. He gave her a hypodermic of strychnin and held salts under her nose until she relaxed.

DR. QUINLAN thought there seemed to be a certain amount of atrophy in the muscles, whether from want of development or disuse he could not say. It did not seem that an hysteria would be so prolonged.

DR. CARTER did not consider the condition as caused by an embolus, thrombosis or hemorrhage. It would be very unusual for the entire side to clear up with the exception of the arm. He had not noted any atrophy of the muscles, although he had looked for it especially. He did not believe that it was an organic condition, or that the patient had had a hemorrhage. He did not regard it as a case of genuine hemiplegia, and was inclined to think that it was an hysterical condition.

DR. IMPERATORI asked if the reflexes had been noted. There is a spasticity with the athetosis, as one would expect in a hemiplegia, and which is not an infrequent sequel.

A facial paralysis and especially of the lower branches of the seventh, on the same side as the hemiplegia, would indicate that the lesion was in the internal capsule.

Was this confirmed by the neurologist?

DR. SCRUTON, in closing, stated that he personally had not observed the electrical reactions of the muscles. The case is entirely under the direction of a neurologist, Dr. Booth, who considers the lesion due to hemorrhage in the internal capsule. The difficulty attending the differential diagnosis between hemorrhage and embolism is forcibly substantiated by the autopsy records of twenty cases reported by Kleber and mentioned by Starr in his text-book. These were cases of supposed embolism where cardiac disease was present and the attack was fairly typical, nine were found after death to have been cases of hemorrhage.

In theorizing, it has been suggested that an embolus having genesis at the tonsil fossa would be arrested before reaching the brain. Practice has established the fact that there is no limit to the remote travel of emboli. Cases illustrating, are those in which embolus of the central retinal artery has occurred immediately following subcutaneous injections of paraffin to remodel the nose.

Nasal Stenosis. DR. H. ARROWSMITH.

The patient was a young man who presented himself at the Kings' County Hospital two or three weeks ago with a history of a long period of nasal stenosis, having had a traumatism. He had a partial sub-mucous resection, and now has a decided artesia of the nose at the muco-cutaneous junction. He was presented to get the opinion of the members as to the propriety of attempting a plastic operation.

The Wasserman reaction was negative.

DISCUSSION.

DR. QUINLAN said there seemed to be an absolute collapse of the alæ of both nostrils with no ridge of septal tissue or framework for the wings to rest upon, and naturally there would be more or less contraction after such an operation. If there was no obstruction of the choanæ, one might pass

tubes and keep them in position for a certain length of time and so produce a patency. There was a slow contraction going on now, and it was like a tent with the side ropes taken away. The contraction, unless checked, would progress until the nostrils are flattened on the face. If an effort were made to first establish a patency, the column of air passing through would help to keep it open.

DR. CARTER said that since Dr. Arrowsmith had asked him to say something about the case, he recalled a similar case of his own in which a good result was obtained by dissecting up a flap of tissue from the floor of the nose, making the incision out under the alæ and then lifting the flap, consisting of skin and mucous membrane, so as to cover the raw surface; he then skin-grafted the raw floor of the nose. The nostril has to be kept open with vaseline gauze placed over this area.

Dr. Arrowsmith's patient presented a complicated condition. He has a large bony spur far back; the bony framework is also displaced. The framework laterally of the nose should first be broken up and Dr. Carter's bridge-splint applied and kept in place for two weeks, until what is left of the framework of the nose is united in proper position, when a transplantation of bone can be made to restore the nasal bridge. The condition will have to be corrected in two or three operations.

Multiple Papilloma of the Larynx. DR. C. G. COAKLEY.

Mr. H. L., age 45 years, came to the office Nov. 14, 1907, complaining of hoarseness.

Previous History. Six years ago, Dr. W. K. Simpson removed on two occasions several polypi from each vocal cord. Voice remained clear for six months after this, when hoarseness began again.

Examination. Examination of larynx showed multiple papillomata along the anterior portion of the upper surface of the left vocal cord, and also on the under surface about the middle of the cord.

On November 14, 16, 19 and 26, 1907, portions of the papillomatous mass were removed. On December 12, 1907, the patient's voice was greatly improved and no papillomata were visible, although the vocal cords were red and thickened. On April, 4, 1908, I saw him again. The general condition of the larynx was much improved. I did not see him again until December 30, 1913, when he came in complaining of increasing hoarseness. Examination revealed multiple papillomata on both vocal cords. On February 16, 1914, eighty-three milligrams of radium were applied to the right side of the neck externally and seventeen milligrams to the left side. Both tubes were left on for twenty-two hours. The patient was seen about every second day for the next three weeks. He developed a rather painful burn on either side of the neck opposite the thyroid and cricoid cartilage, more so on the right than on the left. The interior of the larynx, aside from a moderate amount of congestion, showed no marked change until February 24, 1914, when it was noticed that the posterior mass on the right vocal cord was not more than one-half its previous size, and the anterior mass had diminished about one-third in size. The voice had improved but was not normal. On March 4, 1914, the patient left town for a trip to the West and I did not see him again until April 4, 1914. His voice had not improved, nor had the interior of the larynx changed appreciably. On April 27, 28 and 29, 1914, radium was again applied as follows: Eighty-three milligrams, two hours on the left; April 28, eighty-three milligrams, two hours on the left; April 29- eighty-three milligrams for one and one-half hours on the left; April 30, eighty-three milligrams two hours on the left. The patient again went away on a trip, and was not seen until August 3, 1914. His voice was very much improved. There were no papillomata visible in the larynx, only a slight thickening of the right vocal cord, at about its anterior third. He was last seen on March 21, 1916, over two years after his first application of radium, and his larynx was still free from any return of the growth.

Epithelioma of the Larynx Treated by Radium. DR. C. G. COAKLEY.

(*Published in the October, 1916, issue of* THE LARYNGOSCOPE.)

DISCUSSION.

DR. MYLES said that the brilliant result obtained in the larynx case should compensate for the apparent infiltration on the outside.

The other case was a very marked one. All who have had to treat such cases have experienced difficulty from year to year in maintaining free breathing, especially in patients of fifty to sixty years of age, and must hail such a result with gratification. The carcinoma case had a certain amount of infiltration in his larynx,—a little feather-edged condition on the cord—and if time did not redevelop the neoplasm, the results would exceed the most optimistic prognosis.

DR. QUINLAN said that it had been his fortune to see in a number of these cases of diabetes, a peculiar herpetic condition involving the soft palate, but they had not approached the degree of ulceration seen in Dr. Arrowsmith's case. This would seem to be a superficial erosion, and the condition might clear up later. He had never seen a real case of ulceration from diabetes, but had frequently observed a condition of superficial erosion.

Ulceration of the Pharynx and Larynx; Diabetic Subject. DR. HUBERT ARROWSMITH.

(Published in the September, 1916, issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. FREUDENTHAL said that he was pleased that Dr. Arrowsmith had brought this subject up for discussion, for it was a most important one. One reason why more of these cases are not seen is that the ulcerations are not painful. He had studied this subject years ago but found no mention of it in the literature; at that time he found, that one has to differentiate between decidedly malignant ulcerations, and a more benign condition. Referring to Dr. Quinlan's remarks, Dr. Freudenthal said that he had seen some very deep ulcerations, some of which improved under local treatment, and others under general treatment. He had also seen cases similar to that described by Dr. Arrowsmith, but the patients died soon after.

DR. QUINLAN asked how much sugar was in the urine, and Dr. Freudenthal replied that he did not remember.

DR. ARROWSMITH, closing the discussion, said that in the other case to which he had referred, with a moderate amount of ulceration in the pharynx, the nasal septum broke down and the patient suffered from almost uncontrollable attacks of epistaxis. He had a very high percentage of sugar and the case progressed very rapidly. These were the only two cases of ulceration that he had seen, but as Dr. Freudenthal had suggested, that may be because these patients are not very sensitive. There seems to be no reason why a gangrenous process is not perfectly possible in the air passages, as well as in other places.

Hypertrophy of the Paratonsillar Gland After Tonsillectomy. Demonstration of Sections of Tissue Under Microscope. DR. HAROLD HAYS.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. MYLES said that he had been much interested in the case reported by Dr. Hays, as he had frequently seen the same condition after as complete an enucleation as possible,—little masses of apparent lymphoid tissue found on the margins, encapsulated, etc. It would be very inter-

esting to hear Dr. Hays' ultimate conclusions in regard to these conditions. Dr. Hodenpyle described the tonsil tissue as being very thin at birth and growing rapidly; dormant small particles left, in cases of young children, can grow as fast as the original tissue.

He had seen small rounded masses in certain cases which were more or less covered by adhesions.

The point that Dr. Hays had made was well taken and if it is proved to be so it will explain what has happened in some of these cases.

DR. COAKLEY said that he had seen the drawings of these cases, and the masses in the throat were certainly large. It was a question, however, whether the term used by Dr. Hays was a good one from the histological standpoint. We are familiar with small collections of lymphatic tissue on the posterior pharyngeal wall; that behind the posterior pillar is an extension of the lymphoid tissues in the naso-pharynx, and if during an examination of the tonsils we carefully examine the anterior and posterior pillars, we will very frequently find little rounded masses of lymphoid tissue in them. It may also be found in the posterior portion of the Eustachian eminences. These should not be regarded as glands, as we speak of the cervical glands, but as small masses of cells scattered in the mucous membrane, which for some reason have enormously increased in size. This lymphoid tissue not infrequently increases in size after the removal of the tonsil. We have to draw a very close distinction between this sort of lymphoid tissue and actual remnants of tonsil tissue, not removed in the operation of tonsillectomy.

DR. COAKLEY further said that he thought there must be some lymphoid tissue in the connective tissue external to the tonsil which could hypertrophy and some years later appear as a round mass under the scar tissue of the tonsillar fossa, and in all respects similar to the small lymph nodes on the posterior pharyngeal wall. He expressed an opinion that the work that Dr. Hays was doing would prove to be very valuable in showing just how much lymphoid tissue there is in children and in older life that is part and parcel of the sub-epithelial structure in the naso-pharyngeal vault.

DR. QUINLAN expressed his agreement with what Dr. Coakley had said and thought that in many of the tonsil operations stumps were to be seen some time afterwards when we felt that at the time of the operation a complete enucleation had taken place.

DR. THURBER said that he always told his patients to expect some enlargement of the lymphoid tissue about the tonsils after tonsillectomy, and that they must not always expect to have a perfectly clean throat; as this lymphoid tissue often took on an increase in size as though it were taking the place of the lost tonsils.

DR. HAYS, referring to Dr. Coakley's remarks, said that in the first place, in the picture he had presented the large masses were almost the size of hazelnuts. The fact that puzzled him was that the family physician insisted that the tonsils had not been removed. He wished he could remove the tissue in these cases, for it would be very interesting to study it.

He had termed them paratonsillar glands, for in the four cases that he had seen there has been one definite gland, not a mass of lymphatic

tissue. The point that had occurred to him was whether in these individuals it was necessary to have a certain amount of lymphatic tissue and therefore there was more hyperplasia than is usual. There must be some explanation of the condition when after the tonsils were removed the family physician should insist that they had not been taken out.

A Case of Septicemia with Polyarthritis and Pulmonary Infarct Following Tonsillectomy. DR. WILLIAM A. SCRUTON.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. QUINLAN said that it was very well, from time to time, to have such a report of an unfortunate occurrence in the experience of our confreres, for the operation of tonsillectomy has been too much minimized. These notes of warning are quite timely. Too frequently a child has its tonsils removed in the afternoon and is sent home the same day. Some time ago he had cited a case making a usual careful excision of the tonsil, swabbing with Dobel's solution to protect the eroded surfaces. In this instance the family physician was certain that the child had no symptoms for five days following the operation. Then the temperature shot up suddenly, and for 16 weeks showed the septic wash every afternoon. The child developed a septic endocarditis. Dr. Quinlan said that it was one of the cleanest operations he had ever performed, and we were at a loss to connect the condition with the work done. Here was a septic endocarditis following a simple tonsil operation, which persisted for sixteen weeks. The child finally got well, but it was a very trying experience.

It could not be too strongly impressed upon the laity that a tonsillectomy is *not* a simple operation. The tonsil is an important gland, situated at the head of alimentation and respiration, and we don't know what may happen after an operation. The tonsils and adenoids are removed in many cases with only the ordinary results; and yet in other cases frightful occurrences may befall our patients. Every surgical precaution should be observed and the patients warned of possible results following these surgical procedures.

DR. HASKIN cited a report by John W. L. Long, in the *Journal of Surgery, Gynaecology, and Obstetrics*, January, 1912, giving a very full account of a septicemia with blindness, endocarditis, abscess of the kidney and lungs, which resulted from a thrombus of the internal jugular vein, from an abscess of the tonsil. These cases are apt to happen even without tonsillectomy. This was the only case he had seen with complete findings after a peritonsillar abscess. The patient eventually recovered, but had a great many complications.

DR. CARTER told of a case which he intended to report fully a little later. The patient, a lady from a distant city, consulted him in regard to her tonsils and wanted them removed. He examined her throat, but could find no tonsils,—only a little scar tissue in the tonsillar fossa. She insisted, however, that about every six months she had an attack of tonsillitis accompanied by rheumatism in the wrists, ankles and knees,—and, at the time of the attack, at the angle of the scapula a large tumor would develop almost as large as a fist, bluish in color and very painful.

She was very insistent that the tonsils should be removed, and accordingly he operated, using a snare. When the tenaculum was engaged in the tonsillar fossa, he exposed quite good sized submerged tonsils which when removed appeared to be thoroughly diseased, and unquestionably were so. Twenty-four hours after the tonsils were removed the woman had an attack of rheumatism, and a mass developed under the left scapula. The nurse directed his attention to this mass, and the skin over it presented a big purpuric spot; it was probably a purpuric condition. He had never seen anything like it before or since.

DR. J. J. KING said that he had been much interested in these cases for the last two years, and had seen a great many rheumatic cases where the tonsils were infected. For some time in all the tonsillectomies he had been doing in private practice he had been making cultures from the crypts, with the idea of giving an autogenous vaccine and so clearing up any infection that might exist, and then operating, in a clean field. That method, if pursued, will go a long way toward preventing septicemia. In a paper which he had read before the New York County Medical Society he had drawn the conclusion that all such cases ought to have a culture taken, and then clear up the infection and operate in a clean field.

DR. IMPERATORI asked if Dr. King had found any bacteria in the crypts after giving the vaccines.

DR. KING replied that he had frequently found infections in the tonsils after treatment with autogenous vaccines, but there was no septicemia. Not long ago he had operated on a woman who first came to him two years ago walking with the aid of a crutch and stick, and with her knee swollen and painful. She was given vaccines and the activity in the joint was cleared up inside of a month, she could sleep at night, and has been well ever since. A year and a half later she had her tonsils removed, and has no trouble with her throat or tonsils since; though a culture taken before the removal of the tonsils showed that they were again infected. At the time of operation half a drachm of pus came from the left tonsil, but she made an uneventful recovery. One may find pus after the administration of a vaccine, but this treatment goes a long way toward stopping the activity of the infection and preventing a sepsis after tonsillectomy.

Stricture of the Esophagus in an Infant Two Years Old. DR. HUBERT ARROWSMITH.

M. D., a female infant two and one-half years old, was brought to my associate, Dr. F. R. Herriman, early in February, 1916, with the following history: On August 18, 1915, she swallowed a solution of lye. Her parents saw at once that her lips and mouth were burned, but paid no special attention to the matter until after a couple of weeks they noticed that it seemed difficult for her to swallow and while she did not refuse food, its digestion apparently produced a great deal of discomfort.

While she was taken to a number of physicians, no direct treatment was attempted until October 15, from which time blind bouginage was practiced twice monthly until she came under Dr. Herriman's observation in February, 1916. At his suggestion she was admitted to our service at King's County Hospital on February 7, late in the day.

She was extremely emaciated and weak and made a most piteous and continuous appeal for water, which, when given in small amounts, was almost immediately rejected. Her temperature was 101, pulse 148 and respiration 46. Owing to the extreme water hunger and weakness, direct inspection of the esophagus was deferred and Dr. E. H. Fiske was requested to do an immediate gastrostomy, which he did on February 8, the interval being devoted to hypodermoclysis at 6 p. m., 12 midnight of the 7th, and 6 a. m. of the 8th, 20-20 and 15 oz. being administered and very rapidly absorbed. Several enemata of dextro-maltose were given and retained.

Under local anesthesia with novocain, Dr. Fiske did a classic gastrostomy in thirty-three minutes, apparently painlessly and without any special shock to the patient. Shortly afterward a dram of water was swallowed and not regurgitated. Thereafter, peptonized milk was administered at regular intervals by the gastrostomy tube, in two-ounce doses.

Early on the 9th, the temperature rose to 103, pulse 140, respiration 126. Thereafter for the next week there was a typical pyemic curve gradually rising. No attempt was made to endoscope the patient.

Autopsy showed that the gastrostomy opening was throughout leak-proof. The peritoneal cavity contained a large amount of greenish, purulent material, the source of which was not clearly determinable. There were no adhesions through the visceral and parietal peritoneum was intensely congested. On raising the right lung a large opening was made into the mediastinum. A small amount of grayish material ran out into the pleural cavity. Just below the bifurcation of the trachea there is a distinct constriction of the esophagus, the wall is thickened and inelastic. Above the constricted portion there is an opening one-half centimeter in diameter, in the anterior wall communicating with the mediastinum, which contains pus and whose walls are sloughing.

As you inspect the specimen you will see that the periphery of the false passage is distinctly organized and therefore of probably some age. Had the patient been in condition, on her admission, to submit to endoscopy, I doubt very much if I would have discovered this false passage for some time, unless symptoms of general sepsis had aroused my suspicion, and in any event, all attempts to dilate the stricture would to a certain extent have served to also open the adventitious passage to the mediastinum and perpetuate its infection. I cannot see in this case, how the most skilled endoscopic intervention could at such a remote date have circumvented the accomplishments of repeated blind bouginage. The traumatism, from the history, might have occurred at almost any time during the four months previous to her admission.

The moral is perfectly obvious. Surely we should strive to impress it on our non-endoscopic brethren.

DISCUSSION.

DR. IMPERATORI said that what Dr. Arrowsmith had said practically covered the subject. However, emphasis should be put on those remarks of the doctor, relating to blind bouging. There are undoubtedly many cases, that are unrecorded and have ended fatally from blind bouging of the esophagus. It is very easily seen how such an accident could occur.

There are cases recorded in which an esophagoscope has been passed through the cricopharyngeal constriction and down into the mediastinum. Such a case is recorded in Jackson's Work on Peroral Endoscopy and Laryngeal Surgery.

Now, if such an accident has occurred—even though the one passing the esophagoscope was unskilled—how much easier may a bougie be pushed through the wall of the esophagus, when done blindly and especially so, should the wall be diseased.

However, the safe procedure in the dilatation of strictures of the esophagus is to pass the smaller bougies, that is, the sizes up to 24 French in the adult and 15 French in children, through the esophagoscope. Of course, later the larger bougie may be safely passed in the usual manner.

Salivary Calculi. DR. FREUDENTHAL.

DR. FRUEDENTHAL said that the salient point in the two cases was that the first patient came to him after having had for only a few days some difficulty in swallowing and pain in eating. He was examined, and under local anesthesia the calculus presented was removed.

The other patient came in saying that he had had a cold followed by an abscess under the tongue. An incision was made into the mass, and foul smelling pus was evacuated. After that a stone was diagnosed and removed. Both cases were in Wharton's duct.

DISCUSSION.

DR. HASKIN said that from the scarcity of cases reported, it would seem that the condition is comparatively rare, but that at one time he had seen

three cases within a year and that it is possible that they are not really so rare as would seem, but that they have not been recognized. He showed the specimens which he himself had removed. (The three cases were reported in the July, 1916, issue of THE LARYNGOSCOPE.—ED.)

Regular meeting, April 26, 1916.

Tuberculosis of the Larynx and Mouth. DR. W. W. CARTER.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

Series of Cases Showing the Results of Treatment for Chronic Stenosis of the Larynx Following Diphtheria. DR. HENRY L. LYNAH.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. DELAVAN said that the Section doubtless appreciated the privilege extended in the exhibition of this unusual series of cases, remarkable for the number of patients and for the quality of the work represented.

The history of the efforts at dilatation of the larynx up to the time of O'Dwyer was one of disappointment, beginning with antiquity and ending with the suggestion several years ago in Europe by which stenosis was to be treated by the retention in the larynx of a soft rubber tube passed through an opening in the trachea into and above the larynx, and retained there for a number of hours at a time. This also proved a failure. To O'Dwyer and, after him, to Rogers and others, we owe our present knowledge of successful dilatation of the stenosis of the larynx. It was profoundly gratifying to find that the progress begun by O'Dwyer and carried on by Rogers was by no means at a standstill. Ample proof of that had just been demonstrated.

The secret of success in the cure of laryngeal stenosis lies in the application of good judgment and of skill. Above everything else is needed the quality of persistence. Dr. Lynah had stated that with several of his patients it required a number of months to secure success. Some years ago the speaker had worked with Dr. Rogers upon an adult case for two and one-half years, under conditions of the greatest discouragement, but finally, to the surprise of all, it became a success. One or two points in connection with it were worthy of special mention, by way of encouragement. On the final removal of the tube from the larynx there were considerable areas of thickening remaining, but as time went by these thickened cicatrices seemed to be absorbed and grew smaller, so that some months after the final withdrawal of the dilating tube the lumen of the larynx was larger, and remains larger to-day, than it was when the tube was withdrawn. That had been a very interesting point in the case. The voice, too, had improved to a marked degree. It seemed highly probable that the children seen to-night would, in the course of time and under the stimulation of a little vocal training, would improve still more, and eventually show results far beyond present expectations.

Dr. Delavan said that he could not refrain from expressing his indebtedness to Dr. Lynah, and his admiration for the work shown. There was nothing more difficult than the management of a stenosed larynx in a

child, and what had been seen to-night would inspire all with much more confidence in the future treatment of such cases.

Dr. MacKenty said that he did not know much about such cases, as they saw few of them at the hospital, but he was much interested in the results as these cases are very difficult to handle. He had been wondering why after a certain length of time and the infection had disappeared it would not be a good thing,—why doing a tracheotomy and giving the larynx a rest would not be a good thing,—why the use of the open trachea might not be advisable in order to relieve the larynx of wearing the tube so long? He would like to know the reason.

Dr. McCoy said that several years ago he saw a child who had been intubated and the tube left in place for a year and a half or so. When the tube was taken out the larynx would close over; so a tracheotomy was done and the tracheotomy tube was left in for several years. When he saw the child, the larynx had closed so that the opening would admit only three wisps from a whisk broom. He would like to know whether Dr. Lynah thought it feasible to dilate such a case. He did a laryngotomy; the tube was put in externally.

Dr. Lynah said that Dr. MacKenty's point about tracheotomy was well taken. However as all of these cases suffer with more or less perichondritis at the cricoid level early in the disease which was the cause of the persistent auto-extubation, early tracheotomy, he has found, did more harm than good, and that was the reason why he had the non-cough up tubes made, for they kept the larynx open and at the same time put a stop to the coughing out of the tube. When tracheotomy is performed in these cases the reconstructed necrotic area on healing will produce such a dense cicatrix above the tracheal canula that it will be impossible to intubate the larynx, and the only means by which the larynx can be opened is to dilate from the tracheal fistula upward by means of sounds.

The question of resting the larynx by tracheotomy had been suggested to him by many eminent laryngologists, but that he found while the wearing of the canula gave the larynx rest, it did not arrest, however, the development of new connective tissue and complete atresia of the larynx was the inevitable result. He was willing to admit, however, that in cases with pure adductor spasm as a cause of the stenosis, the condition would be improved by allowing the muscles and cords to work and would accomplish the desired result as Dr. MacKenty had stated.

Replying to Dr. McCoy, Dr. Lynah said he thought the case referred to could be dilated. The only way to treat these chronic tracheal canula cases was to dilate from the tracheal fistula upward as suggested by Dr. John Rogers.

Dr. Lynah said that he had made a series of sounds with obturator attachments at the end, and after the larynx was sufficiently dilated, the O'Dwyer tube could be introduced into the larynx by using the obturator end of the sound as a guide while the sound was brought out at the tracheal fistula. It was also very important to have these sounds deeply tunneled so that on introduction into the tracheal wound there would be free space for respiration. A sound that fit the tracheal fistula snugly would have to be immediately removed, and dilatation would be unsatisfactory. After the larynx is once opened it is not difficult to dilate with

tubes, increasing the diameter 1 m.m. each week until suitable dilatation has been accomplished.

He had performed laryngo-fissure on some of these cases, but the results were not as satisfactory as by dilatation only.

DR. MCCOY asked if Dr. Lynah would make an excision of any of the tissue.

DR. LYNAH replied in the affirmative. He had in some cases split the larynx open, but there was a general velvety polypoid tissue which covered the entire lumen, and this tissue bleeds so freely to the slightest touch that it cannot be dissected out. It was impossible to dissect it unless the entire larynx was removed. On the other hand, the tuft-like polypoid projections which occur at the base of the epiglottis and ventricular bands were removed endo-laryngeal.

Laryngectomy for Carcinoma. DR. JOHN MCCOY.

The patient first presented himself at the Univ. Bellevue Clinic on February 14th, 1916. For ten months he had hoarseness and had lost some weight in that time. Under suspension laryngoscopy the larynx was examined, and an infiltration in the right vocal cord was found, extending forward and over the left side of the larynx. A section was taken and sent to the laboratory for examination, and epithelioma was reported. That was on February 16th. On the 20th, at the New York Eye and Ear Infirmary, a tracheotomy was done and a week later a complete excision of the larynx was made. The patient had several factors in his favor, and made an uneventful recovery. In the first place, he had always lived a normal life, was not alcoholic, and did not smoke much. In the next place, all of his teeth had been extracted, so at the operation it was a simple matter to sterilize his mouth, so that there was no difficulty with sepsis in the throat wound. In the third place, the operation was performed under rectal anesthesia; the patient was brought to the operating room sound asleep and breathed so quietly during the operation that he could hardly be heard, and there was no irritation of the tracheal and bronchial membranes from administering the ether. The operation was performed, he was returned to his bed, and woke up an hour later. We feel that the method of anesthesia helped to avert the danger of pneumonia. These three factors aided in bringing about a wonderful convalescence, in that there were no complications whatsoever.

So far as could be determined, the patient had no glandular involvement. Of course he would be kept under close observation for some time to note any possible recurrence. The pathological report on the excited larynx by Dr. Fraser, of the University Bellevue Medical College, is as follows:

Tumor is typical epithelioma infiltration on right side, extends from upper border of vocal cord downwards for 16 m.m. and from the anterior median line 22 m.m. outwards. On left side it extends from upper border of vocal cord downwards for 13 mm. and from anterior median line outwards for 5 m.m.

DISCUSSION.

DR. MACKENTY said that Dr. McCoy had certainly gotten a very good result. The point made about the absence of the teeth was well taken. In cases that he had operated upon it took so long to get the patients in con-

dition, and where the teeth were bad the mouth was in such an unhealthy condition that there was almost certain to have an infection. In fact, infection of the wound in serious cases was the rule, and sometimes the infection was quite severe, and the worst part of the whole procedure was the care of the infection. One is to be congratulated when primary union occurs. In only one case had he obtained primary union. Almost all of his cases had infected mouths.

DR. MCCOY replied that a tube was passed through the nose, a preliminary tracheotomy was done a week beforehand. The rectal anesthesia made it a delight to operate.

DR. SCRUTON asked if the rectal anesthesia was an oil-ether anesthesia.

DR. MCCOY replied in the affirmative, an ounce of ether to every twenty pounds of body weight.

DR. SCRUTON said that nearly ten years ago he had done the same work with colonic anesthesia, but not with the oil-ether. He employed ether vapor and conveyed it into the bowel. He had twelve of these cases. The second case was a laryngectomy done by Dr. Hurd, and he expressed the same pleasure concerning the anesthesia that Dr. McCoy had experienced. Dr. Hurd constantly asked if the patient was alive, for he breathed so quietly, and there was no trouble with mucus. The oil-ether colonic method seems to be ideal, and he hoped Dr. MacKenty would try it at the Manhattan Eye, Ear and Throat Hospital.

DR. MACKENTY replied that he was a little afraid of it (oil-ether anesthesia), as he did not believe one can control the amount of ether given. He thought there was a considerable death rate attending it. In all of the cases he had seen it given he was very much afraid of the extreme and profound anesthesia presented, so profound that it seemed it must do some injury. If given by the mouth carefully, he could see no danger of post-operative pneumonia, providing the patient is carefully watched and is kept free from secretion by the negative pressure and suction. He had used general anesthesia, and had had no cases of pneumonia. In the work at Vanderbilt they used local anesthesia, and their record, too, was very high. He might be wrong, but he was afraid of rectal anesthesia. Spinal anesthesia was much spoken of in its day, but no one hears of it now. He believed that all would go back to the old anesthesia, but oil-ether is a beautiful anesthesia and it is a great convenience in operating, if it could be made as safe as the other.

DR. ARROWSMITH said that he had had experience with oil-ether rectal anesthesia in something over three hundred cases, and in only two instances had he seen any bad results. One patient died before the instillation of the oil-ether had fairly begun; the other died three hours afterwards, but apparently the death was not in any way due to the anesthetic. He had used this method of anesthesia in almost every possible condition in the upper respiratory passages and in work about the jaws and head. Like every other method, all due precautions must be observed. The administrator must be conversant with the technique. In the two cases to which he had just referred, the whole administration was managed by an incompetent interne. He himself had used the oil-ether in some very serious cases, particularly one of general stenosis of

the trachea and bronchi, where any form of respiratory anesthesia would have been fatal, beyond a doubt. Even the attempt to administer such anesthesia would probably have brought on spasm and trouble. In this case, Dr. Imperatori witnessed the whole procedure and results. The patient was brought to the operating room anesthetized, and there was absolutely no spasm, the pulse was not affected; after the operation he was returned to bed and waked up comfortably after a short time and said he felt better than he had done for a long time. In that patient even the excitement of undergoing a physical examination had brought on attacks of dyspnea from which he almost died. The objections to oil-ether are purely theoretical. In one institution rectal anesthesia was given once; the patient was nearly moribund with Ludwig's angina and died during the operation. It is very easy to confuse post hoc and propter hoc. One must weigh all the evidence in a case of this kind. If the procedure is carried out under the very definite rules laid down by Dr. Gwathmey there was no reason why it should not be as safe as any method of anesthesia. By increasing the air supply, the anesthesia can be decreased; by stimulating respiration the anesthesia can be stopped as quickly as by withdrawing the cone. The main points are the proper preparation of the patient, the proper preparation of the rectum, and the adjustment of the dosage to the body weight.

As far as subsequent ill effects were concerned, Dr. Arrowsmith said he had never seen any; he had never seen any irritation of the rectum. As Dr. Scruton has said, when the ether vapor after the method of Cunningham was given carefully, in 40 or 50 cases which Dr Erdmann had anesthetized for him, there had never been any trouble. Dr. Arrowsmith repeated most emphatically that he believed that oil-ether rectal anesthesia was one of the greatest advances that has been made, particularly in our field of surgery.

Dr. Carter said the discussion seemed to have changed from laryngectomy to rectal anesthesia, but that he did not think the question of how the dose of ether can be controlled has ever been satisfactorily answered. If there is too big a dose of ether, there will be ether poisoning. How is it going to be removed? That question has not been answered yet.

Dr. Scruton said that he had had a considerable amount of experience in experimenting on dogs with the vapor method. He had had no experience with the oil-ether method, but he had proved to his own satisfaction that it is impossible to kill with the vapor method alone, because a satisfactory depth of anesthesia generally could not be obtained unless preliminary doses of morphin were given.

This method of colonic administration of ether is very important from the standpoint of the men who are doing laryngectomy. It has been proved by everyone who has used it, whether oil-ether or ether-vapor, that it is a light anesthesia. As in my experiments, it has been found in practice, necessary before using it to give the patient one or two doses of morphin—and one gauges the dosage just as in giving anesthesia by mouth. If the patient gets too deep, it can be withdrawn. The case can be controlled as absolutely as when giving it by the mouth.

Dr. MacKenty said that in his opinion the use of morphin before anesthesia was a great menace to the patient, and many had died from it.

Persons expert in the use of anesthesia will tell you that they prefer their patients not to have morphin. Anything injected into the rectum will find its way into the colon and around the caecum in a short time. If oil-ether is put into the rectum, what will prevent its finding its way into the caecum? It cannot be avoided. He repeated that he was very much against the use of morphin before anesthesia.

Traumatic Destruction of the Tip and Soft Part of the Nose: Plastic Correction of the Deformity Not Completed. DR. JOHN D. KERNAN, JR.

The patient had come to Dr. Chappell's clinic at the Manhattan Eye, Ear and Throat Hospital eight months ago, with a history of having had her nose bitten off two weeks earlier. The nose was in a horrible condition, being badly infected and having strips of ragged flesh hanging from the stump. In the course of the healing she arrived at the condition shown in the photograph presented.

Before the injury, the patient had a high Roman nose with a fairly big hump and a prominent tip. The tip being gone, she had a very high hump, with only a jagged stump, in place of the tip, below. In addition, she had complete obstruction of the right nostril and nearly complete obstruction of the left.

In repairing the deformity, in order to fill in the gap below and make the nose more in proportion, the hump was sawed off sub-cutaneously, leaving it attached to the skin and periosteum. The whole mass of bone which composed the hump, with the overlying soft structure, was slipped downward into the gap where the tip had originally been, and was sewed into position. Sufficient relaxation of the tissue was gained by means of a transverse incision across the bridge of the nose. This incision was closed by a secondary operation, at which time the wound unfortunately became infected, and more of a scar was left than would otherwise have occurred. The contraction of the nostrils was overcome by excision of the scar tissue and the insertion of skin grafts. The patient now had good nasal respiration.

Although the appearance of the nose had been greatly improved, the tissue transplanted had not been altogether sufficient to fill in the gap left by the removal of the tip; so the case was presented for suggestions as to the completion of the tip of the nose.

DISCUSSION.

DR. CARTER said that he had operated upon similar cases and described by a blackboard demonstration his method of lengthening the nose and bringing down the tip by utilizing a portion of the septum.

A Case of Phantom Tumor. DR. FORBES, FOR DR. HARRIS.

The patient was a young girl who had presented herself at the Post-Graduate Hospital in the service of Dr. Harris, with the history that for a couple of years past, following the eating and swallowing of her food, there would appear a tumor in the region of the left submaxillary gland. It was soft and could be felt under the skin; it could also be seen beneath the tongue on the left side. A strange feature was that by simply chewing would bring no results, but by eating anything, as an apple, etc., the swelling would occur. Dr. Harris at first thought that there might

be a calculus acting as a valve, but none could be found. Three x-ray plates were made but failed to show presence of salivary calculi. One man had suggested the possibility of a stricture; that would seem theoretically a possible explanation, because within an hour or two after the tumor appeared, evidently from the excitation of eating and swallowing, the tumor would disappear of itself.

Laryngectomy: Seven Months after Operation. DR. MACKENTY.

DR. MACKENTY said that he presented the case mainly because it demonstrated the fact that laryngeal cancer, from an operative standpoint, may never be inoperable. If there ever was an inoperable case, this man had presented it. He came to the Manhattan Eye, Ear and Throat Hospital last September with the larynx completely filled with cancer, and a tracheotomy had to be done to restore his breathing. When he was operated upon three or four weeks after the tracheotomy, the growth had extended through the larynx into his neck, and there was a big broken down mass. The larynx was softened and necrotic. The tissues of the neck were cleaned out, and the larynx was removed—but it was feared that the growth would recur before the wound healed. There was an extensive infection following the operation, and at the end of six or eight weeks the whole wound was opened. The esophagus was opened, and the patient was fed through a tube. The nasal tube was dispensed with.

Under novocain anesthesia a plastic operation was done, and the opening in the neck was closed. Then the patient left the hospital, with instructions to report at the clinic occasionally. That was in November, and Dr. MacKenty said he had not seen the patient since, until Sunday, when the man appeared at his office. Until then, he had thought that the man had gone off and perhaps had died, and he had given him up as a lost case, but he came back (seven months after the operation) with no recurrence, and apparently in splendid health, and was working as an automobile mechanic. Not only that, but he had fairly good speech and could make himself understood fairly well. He was very contented, and was certainly much better off than if he had not been operated upon.

The patient was wearing a bronchial tube, although he did not really need it, but claimed that without the tube he felt the necessity for more air while working. The tube was a poor one, a remnant of old days, and a larger and more suitable one was being made for him. The patient stated that when working he requires more air, but takes out the narrow tube and uses the outer one only.

Dr. MacKenty said that a year ago he had operated upon a woman for cancer of the larynx, a case almost as bad as this one, but the growth had not perforated the cartilage. That woman was well and strong, a year and a half after operation.

This case, however, was the most extreme one upon which he had ever operated, and the results were very gratifying. His symptoms had begun nine months before the operation.

DISCUSSION.

DR. DELAVAN said that in a case similarly operated upon by Dr. J. Solis Cohen of Philadelphia, about twenty-five years ago, the first case in this country at least, in which the severed end of the trachea had been isolated

from the pharynx and its free end fastened to the external incision in the neck, the patient had acquired a voice of sufficient volume to be heard throughout a large hall. The voice of Dr. MacKenty's patient would probably show much improvement with increased experience. *Demonstration of method on board.

DR. MCCOY said that Dr. MacKenty was certainly to be congratulated upon the wonderful results obtained. One of the most interesting points in the case was the correction of the hole in the esophagus, and he hoped Dr. MacKenty would tell how this was accomplished.

DR. MACKENTY replied that the most important point was to wait until the tissues were thoroughly cicatrized and everything was smooth and clean. It was then easy to cure them. He did not consider himself as being very expert in plastic work, but had never failed to cure such conditions by waiting until the tissues were healthy. The failures come when one is in too much of a hurry.

DR. VOISLAWSKY said that on looking at these cases he recalled the remarks made some years ago by an eminent surgeon that he would like very much to get a number of cases for laryngectomy. At the time it seemed rather strange that our friend should have been so much criticised by the medical profession of New York for his request. It now occurred to him that inasmuch as the Section was fortunate in having men who had done so much for stricture of the larynx as had been demonstrated by Dr. Lynah in the cases of the children, and by Dr. MacKenty and Dr. McCoy with the beautiful results in cases of laryngectomy, that instead of all the members trying to do this work with more or less—mostly less—good results, it would be wise to get into the habit of sending such patients to men who did such excellent work. It certainly would be best for the public in general.

From the standpoint of a member of the Section, Dr. Voislawsky thought that perhaps such a suggestion coming from him might take better with the general medical profession than if the appeal were made by the surgeon doing a particular work, even though the request was made with the best intentions.

Safety-Pin in the Larynx; Perilaryngeal Abscess Treated for Diphtheria. DR. HENRY L. LYNAH.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. FORBES told Dr. Lynah that a case had been treated at one of the institutions of the city for laryngeal diphtheria and at end of three or four weeks part of a safety pin was coughed up; the remainder was discovered in bronchus by x-ray.

A Case of Septic Arthritis Following a Submucous Resection of the Nasal Septum. DR. C. J. IMPERATORI.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. FREUDENTHAL said that Dr. Imperatori's case was interesting, as it showed a very severe infection. It was not necessary to find pus, for an infection might travel through the blood vessels, the lymphatic, perilymph

spaces, etc. In former years one heard much more of such infections, especially after the application of chromic acid for throat and nose conditions. Various conditions resulted which were nothing but infections.

DR. SCRUTON said that he had had a case somewhat similar to Dr. Imperatori's, although it did not go on to pus formation. The patient was a boy of fourteen who had a submucous operation performed, and returned to the clinic three days later complaining of pain in his knee. Dr. Scruton was very busy at the time, and did not pay much attention to the complaint, and did not see the boy again until seven weeks later, when he stated he had been confined to bed six weeks with arthritis and had been treated for rheumatism. The Doctor said that he believes that the condition was an infection. He agreed with Dr. Freudenthal that these cases were more common than is generally recognized, and that the so-called rheumatic pains following tonsillectomy and operations on the nose are common, and that they are mild types of infection.

DR. DOUGHERTY said he could cite two such cases. In one instance the operation had been performed by his house surgeon at the City Hospital. The operation was in no way bungled, but unfortunately the packing was removed and the patient allowed to leave the hospital the next morning. Ten days later he was brought in by the ambulance in a markedly septic condition. Examination showed not only a septal abscess but also abscesses of the knee joint and left hip. These were opened and drained by the late Dr. Dawbarn, and the patient made a good recovery.

The second case was referred to him for mastoiditis following a submucous performed a week previously. A simple mastoid operation was done and a large infected abscess was opened. Both were streptococcic. The patient subsequently developed a septic arthritis and empyema, had two ribs resected by Dr. C. H. Peck, and later died from pulmonary abscesses.

DR. MCCOY said that someone has remarked that the poorer the operation the less the danger of complications in submucous resections. That may be true, for the patient gets very much better drainage. In other words, the cases that get infection are the cases in which both sides of the membrane are intact, both membranes are closed and hemorrhage ensues between, and that becomes infected. He had had several cases of hematoma and some of infection, especially in clinic cases; and finally he instituted the custom of going way to the extreme rear of the septum at the end of the operation and taking out a small section of tissue on the side of the initial incision, usually about a quarter of an inch in diameter, and has since had no further trouble. The small section removed gives sufficient drainage, the blood does not dam up and become infected.

Hemiplegia Following Tonsillectomy. DR. G. F. GRACEY (by invitation).

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. CARTER said that the Section was to be congratulated upon having such an interesting case presented in such a masterly manner by Dr. Gracey. He himself had never seen such a case, but one might surmise as to just what the case was from the behavior of some cases of articular infections following tonsillectomy. At the last meeting of the Section

some cases were reported in which reference was made to the exacerbation of the articular symptoms following tonsillectomy, and he himself had mentioned a case he had had under observation a month before. He had heard of several since. When the tonsils are taken out, there is a temporary exacerbation of articular symptoms. Dr. Gracey mentioned that his patient had a soft murmur. This evidently was an endocarditis, and it might be safely assumed that this was due to a focal infection in the tonsils. It would seem that it was a case of exacerbation due to removal of the tonsils, of an old endocarditis, and that a dislodged embolus from one of the valves had caused the hemiplegia.

DR. QUINLAN cited a case which he had reported some time ago. The patient was a child whose tonsils and adenoids were removed; following the operations the child was in bed for seventeen weeks with a septic endocarditis. These cases occur more frequently than is generally reported. For the past year or so he had been in the habit of making an application of one-half per cent grain iodin to the stump of tonsils, not enough to act as a caustic, but simply as an antiseptic; after a few days there was a good healthy slough, which came away.

The knee joint condition reported reminded him of a case that occurred in his practice years ago. The patient was a young man with an acute middle ear trouble. Inside of three weeks he had a metastatic abscess of the elbow joint.

Many of these cases have hitherto escaped attention as well as record, but of late so many have been observed and reported it is to be hoped that more consideration and care will be devoted in future to these operations and not minimize the many dangers that so often beset our path.

Hitherto tonsil and adenoid operations have been regarded as trifling by the laity and this impression has been created by the manner we have taught to look upon our work in this region.

DR. FORBES asked if any of the men had had any experience in the preliminary use of vaccines in these cases. Dr. King had been doing some of this work in one of the orthapedic institutions of the city, and found that by making a culture and having an autogenous vaccine prepared and given in a series of injections, the infection could be cleared up; after which the tonsils were removed. In other words, he used the vaccine as a prophylactic measure.

Demonstration of Jackson's Positive Radiograph Film for Locating Foreign Bodies in the Bronchi. DR. HUBERT ARROWSMITH.

The purpose of Jackson's films is best described in his own words (Peroral Endoscopy, p. 229): "There is a class of cases in which the intruder may never be found, if there has been no accurate localization. Small foreign bodies or those small in one diameter, following the general rule of foreign bodies on the air passages, keep on going downward until they get into the smallest possible bronchus. Thus, needles and small headed pins get very far down and very far out into very small branch bronchus, of which there are many. To search these with a probe or minute tube consumes a large amount of time Jackson has devised for help in these cases a positive transparent film of the tracheo-bronchial tree. The film being a 'positive,' the tree is transparent. It is laid over the negative

of the patient showing the foreign body; the foreign body will show through the overlying film. Bony landmarks are not reliable, and the visceral landmarks are necessary, the two of importance being the dome of the pleura and of the diaphragm."

DISCUSSION.

DR. LEWALD said that the method undoubtedly had certain merits, and would probably be valuable in many hospitals which were not equipped to take stereoscopic views in locating a foreign body in relation to the chest wall. Some persons do not have the power to see stereoscopically, and so lose the effect of the stereoscopic radiograph. The same thing applies to foreign bodies in the tissue. Some surgeons do not have the binocular vision necessary to see the various relationships, but if they can do that, they will have little difficulty in removing a foreign body. Many persons have the impression that a stereoscopic radiograph settles the whole thing, but it may be necessary to stereoscope in more than one direction.

New Ethmoid Curette: Cadaver Demonstration of the Instrument in Use. DR. E. ROSS FAULKNER.

The primary object of this instrument is to make a safe means of completing the Mosher operation. The large ring with a cutting edge front and back will enable the operator to cut down partitions and scrape out granulation without any danger of perforating either above or externally. The small cutting ring on the other end of the instrument enables one to clean out the small anterior cells internal to the lachrymal and posterior to the nasal process. When this has been accomplished the frontal sinus is usually opened. Another special curoid curette to facilitate the enlargement of the frontal opening was also demonstrated, also a modification of the Myles chisel for making a larger opening into the antrum for permanent drainage.

The cadaver demonstration was conducted on the split head. The marking of the instrument being shown by a spotlight. The ethmoid labyrinth was thoroughly exenterated in the specimen demonstrated.

DISCUSSION.

DR. MACKENTY said that he had had a great deal of experience with this curette and thought it a much safer instrument than any one he had used before. If it is sharp, it cuts the cells out very nicely and there is no danger of perforating with ordinary careful handling. The ordinary curette is too sharp pointed and there is danger of perforating. He had not used the curette for operating on the frontal sinus; for that he preferred the the curette for operating on the frontal sinus; it is very important not to destroy the mucous membrane; he could vouch very strongly for the curved curette for getting out the granulations quickly and thoroughly.

Demonstration of Improved Lung Motor. DR. JAMES M. BOOHER (by invitation).